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1930.—Transactions, Vol. LXXVIII: Part I, £1 10*s.* 0*d.*, to Fellows, £1 2*s.* 6*d.*

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that the method is most commonly found. The eye-spots near the margins of the wings of butterflies have been actually *seen* to be specially attacked by enemies (*Trans. Ent. Soc. Lond.*, **1902** : 440, 441 and references), and indirect evidence of such attack is extremely common. Then there are the " tails " near the anal angle of the hind-wing in Papilios, Nymphalines, and especially in Lycaenids, where they are often antenna-like and rendered conspicuous by the " eccentric " movements. These structures and movements, combined with the associated lobes and eye-spots, and the habit of settling head downwards, have led many independent observers to recognise the resemblance to a head at the hind end of the insect (*Proc. Ent. Soc. Lond.*, **1922** : xlix and references), while indirect evidence of attack at this spot is especially frequent, the latest record, among our British butterflies, having been communicated to the last meeting of the Society (p. 7).

I therefore propose to extend the terminology originally published in the table following p. 339 of *Colours of Animals*, Poulton, (London, 1890), by adding Paraseme and Parasematic, from παρά, beside or deflecting, and σῆμα, a sign or mark. The term Paraseme, it is believed, falls naturally into its place in the series :—Aposeme (Warning Colours); Pseudaposeme (Batesian Mimicry or False Warning Colours); Synaposeme (Müllerian Mimicry, or Common Warning Colours); Episeme (Recognition Markings); and Pseudepiseme (Alluring Markings). The word has been chosen after much kind help given by my brother Fellows of Jesus College, Oxford.

CONVINCING PROOF OF THE UNPALATABILITY OF THE LARVAL *DANAIDA PLEXIPPUS*, L.—Prof. POULTON said that his friend Commander J. J. Walker had told him of an observation on this subject recorded in 1914, *Ent. Mon. Mag.*, **50** : 191, 192. The facts were so interesting and bore so directly upon questions which have been recently discussed in the publications of the Society that he had ventured to quote the passage :—

" . . . I may record an unpremeditated experiment which clearly demonstrates the extreme unpalatability of the insect in the larva state. One day in May, 1903, while my friend Mr. H. J. Carter and I were lunching in the garden of the hotel at Narrabean, a few miles north of Sydney Harbour, a small pet monkey picked my pocket and made off with a pill-box containing two full-fed larvae of *D. plexippus*. She at once proceeded to devour the tempting-looking caterpillars, and it will be long before I forget the expression of supreme disgust on the face of the little creature when she realised the flavour of her supposed prize, nor the ludicrous haste with which she rejected the nauseous mouthful, even rubbing her tongue vigorously on the grass for some time to get rid of the taste."

COLIAS CROCEUS, FOURCR., (*EDUSA*, L.) EATEN BY A ROBIN.—Prof. POULTON said that Dr. G. Vernon Bull had kindly given him the following interesting note which strongly suggested that the " Clouded Yellow " is palatable but is rarely found to bear the evidences of attack because of the advantage conferred by an exceptionally swift and irregular flight.

" In the autumn of 1928 I brought home two or three *C. croceus* for further examination. After stupefying them I put one out on the window-sill to revive and it was blown off on to the flower-bed below. A robin flew to the spot and looked at it, pecked it twice and then bolted it whole."

Further observations by Dr. G. Vernon Bull on the pairing of *Saturnia pavonia*, L., in captivity.—Prof. Poulton said that Dr. Bull had kindly sent him the following account of an observation bearing upon his earlier experience recorded in 1928, *Proc. Ent. Soc. Lond.*, **3**: 37.

"On 20 April, 1929, a *S. pavonia* ♀, bred from a Rannoch larva, emerged in my cage (15½″ × 11¾″ × 11¾″). I left home on 22 April, and, returning in the afternoon, found that a ♂ had emerged and the pair were *in copulâ*. The male was in excellent condition, and I have no better specimen in my collection. Ova were deposited the same evening (3 batches). Mr. Newman, to whom I sent the largest batch, informs me that the ova were not fertile. The other two batches which I gave to young collectors near by also failed to emerge. In the instance I described to you last year the ♂ was very battered and the ova were fertile."

Prof. Poulton said that the later observation might perhaps be interpreted on the hypothesis that this male, enclosed in a limited space with the female, had been prematurely stimulated before the complete physiological sequences had been fully prepared by flight during a sufficient period of time. Comparison with other records suggests that such precocious acts are relatively rare in "assembling" species.

The Empid fly *Pachymeria tumida*, Mg., preying upon other flies much larger than itself.—Prof. Poulton exhibited two male specimens of this little-known Empid, kindly given to him by the captor, Mr. J. E. Collin. They had been taken, 6 July, 1925, near Buckingham, one of them carrying a male Anthomyiid, *Hydrotaea irritans*, Fln., (Mydaeinae), the other a male Tachinid, *Onesia agilis*, Mg., (Sarcophaginae), kindly determined by Mr. C. J. Wainwright, who had written: "I have satisfied myself that the Tachinid is our common species which I call *agilis*, Mg. This is, I think, what Lundbeck calls *biseta*, Villen., but I have little doubt that he is mistaken and has mixed the two species: though it may be that *agilis* does not occur in Denmark at all. I mention this because so many people will be using Lundbeck and it may be wise to label the specimen *agilis*, Mg. (? = *biseta*, Lundb.)."

Mr. Collin considered that the male *Pachymeria* had doubtless captured the prey as a wedding gift for its female, as Mr. A. H. Hamm had described in other species of the genus.

Mr. J. E. Collin exhibited the following additional examples of Dipterous prey, all males, carried by males of *Pachymeria tumida*:—

Hydrotaea irritans, Fln., ♂ (2)—Butley (Suffolk), 11.7.08, nr. Buckingham, 6.7.25; *Mydaea setiventris*, Rngdl. (= *M. duplaris*, Stein *nec* Zett.), ♂ (2)—nr. Buckingham, 6.7.25; *Onesia agilis*, Mg., ♂ (2)—Butley (Suffolk), 12.7.08, nr. Buckingham, 6.7.25.

A further note on the hibernation of *Musca autumnalis*, De G., (*corvina* F.) in a loft at St. Helens, Isle of Wight.—Prof. Poulton exhibited six males of *M. autumnalis* taken 21 December, 1929, from the cistern-loft in which these flies regularly hibernate, as recorded in *Proc. Ent. Soc. Lond.*, **1915**: xxi; **1918**: xxii; **1920**: ii. During the past winter they had entered in such numbers that their drowned bodies had again caused an unpleasant smell in the water and partially obstructed the flow from some of the ball-taps. The gregarious habit had been very clearly marked, an immense number collecting in a black mass on the irregular thickened end of a stick which was lying across one of the cisterns. The crowd of flies was restricted to a length of about 6 inches, the remaining two feet being entirely free. They were disturbed, probably by taking a candle into the loft, and a day or two later were found to have moved in a body to the inner surface of the close-boarding of the roof.

INSECTS COLLECTED BY DR. J. A. DOUGLAS, D.SC., F.G.S., IN A HITHERTO UNEXPLORED AREA OF E. PERU. INTENSE PAIN CAUSED BY THE BITE AND STING OF A WINGED FEMALE PONERINE ANT.—Prof. POULTON communicated the following notes by Dr. Douglas and exhibited the insects referred to therein :—

" During October 1929 I was on a prospecting expedition on the Huayllumbe river in Eastern Peru. This is a tributary of the Nusiniscato which joins the Araza to flow into the Inambari, which is itself a tributary of the Madre de Dios, one of the headwaters of the Amazon. It is a densely forested region about 120 miles east of the Andes and 3000 feet above sea-level.

" One morning after putting on and lacing up my boots I was walking out of the tent when I felt a sudden intense pain in my right toe, and thought I had been stung by a scorpion. I hastily took the boot off and shook out a large ant [a winged ♀ of *Paraponera clavata*, F.]. This had bitten a small piece from underneath my toe-nail through a thick woollen sock, and had kept up a continuous sting for I suppose some 15 seconds. The pain, which can only be described as acute agony, lasted for more than an hour, and but for a tumblerful of neat brandy I should certainly have fainted. I have no hesitation in saying that such a sting might easily have fatal results, although, in the unusual circumstances, I doubtless received more than the normal dose. Although less intense, the pain continued for 24 hours but caused no external signs of inflammation. The native Indians of that district call the ant " Zapancari." They said that the pain usually lasted for about 24 hours.

" Wasps' nest, taken from under surface of large leaf on bank of the Huayllumbe river. [One of the wasps extracted from the nest was *Polybia occidentalis*, Oliv., a common S. American species.]

" Large moth, found dead in the river Santo Domingo, a tributary of the Huayllumbe. [*Rothschildia* (*Attacus*) *petis*, Walk., ♀, Peruvian form.]

" Large bug, taken with bright light outside tent on Palcamayo Chico, Huayllumbe river. [The Coreid, *Pachylis pharaonis*, Herbst, ♂.]

" Scarlet beetle found near the mouth of the Yanahurco river, a tributary of the Quitari, which flows into the Nusiniscato. [The Elaterid, *Semiotus sanguinicollis*, Blanch.]

" Phasmid, found by the upper waters of the Yanahurco river." [The specimen, which is in poor condition, does not resemble any species in the British Museum.]

The specimens collected by Dr. Douglas were kindly determined by Mr. G. J. Arrow, Mr. R. B. Benson, Mr. W. E. China, Mr. W. H. T. Tams, and Mr. B. P. Uvarov. It was hoped that the circumstances in which the Elaterid had been taken would throw some light on the meaning of its brilliant colour and remarkable pattern. It was, however, found upon the bark of a tree which had been felled and had probably been subjected to considerable disturbance.

EFFECTIVE ATTACK BY A COMMON WASP WHEN THE NEST IS DISTURBED. EVIDENCE OF ACCURATE VISION AT A DISTANCE, DURING FLIGHT.—Prof. POULTON said that the underground nests of *Vespa vulgaris*, L., and *germanica*, F., often appeared in his garden at St. Helens, Isle of Wight. They were usually made in a bank beside a much-frequented path, but the wasps flew in and out, paying no attention to the ordinary movements of people going to and fro. Unusual movements in the vicinity produced a different effect. He remembered, many years ago, that one of his children passed close by a nest dragging a load of branches over the gravel. Instantly one of the defenders flew out, darted straight at his face, backed well up into one nostril and inflicted a peculiarly unpleasant sting. He was reminded of this by a more elaborate attempt to adopt the same method of attack in the summer of 1928. In that year there were two such nests, one on each side of the path within the entrance gates. This seemed to be going too far and the aid of cyanide of potassium was invoked. One of the colonies was, however, imperfectly destroyed, and, in attempting to kill some of the partially poisoned wasps around the entrance to the nest, the defenders within were aroused to activity. After being stung twice, but not upon the head, he thought it was about time to retreat, and walked somewhat rapidly to the house. At about 21 ft. from the spot where he had been standing the path curved sharply round a dense bay-tree through which the nest could not be seen, nor was it visible from any part of the remaining distance (15½ ft.) to the casement window by which he entered. He then walked (13½ ft.) across the room and turned round, for the first time facing the direction from which he had come and incidentally a pursuing enemy. Instantly, a wasp from somewhere near the window flew bullet-like across the room straight at his face and alighted on his moustache, just below one nostril, which it was evidently attempting to reach. He had time to take the forceps from a table, turn back to the mirror over the fireplace and pull the wasp off, but even then its head was left behind clinging to one of the hairs.

The facts appeared to prove the existence of very accurate vision at a distance of at least 12 feet; also a settled determination on the part of this defender—very different from that of the other wasps which dashed out and stung anywhere—to follow quietly and delay attack until a favourable opportunity for an especially effective sting presented itself.

SOME LYCAENIDAE FROM NEW GUINEA.—The PRESIDENT exhibited specimens of two species of LYCAENIDAE from New Guinea, *Deudorix dohertyi*, Oberth., 1894, and *D. grandis*, Roths. & Jord., 1905, in which the upper sides of the males are metallic blue and black and those of the females white and black, the under sides of both sexes being green. The female of *D. dohertyi*, which has not yet been described, differs from that sex of *D. grandis* in that the fore-wing bears a white, faintly greenish, discal band just outside apex of cell from near costal margin to hind margin, about 5 mm. broad; in the hind-wing being white from abdominal margin forward to first radial or to costa, the white area not entering cell, narrowing anteriorly and being much shaded with bluish green posteriorly; and in the underside being like that of the male, except that the white discal line is more distinct, especially on the hind-wing. Both *D. dohertyi* and *D. grandis* vary geographically.

SOME EREBIID BUTTERFLIES FROM STYRIA.—Mr. L. G. HIGGINS exhibited five species of *Erebia* from Styria and for comparison the same five species from the Brenner. The tawny markings were seen to be extensively developed in all the Styrian races, but almost obsolete in those from the Tyrol.

Mr. Higgins also showed specimens of *Erebia epiphron* and of *E. christi* from the Laquintal and of *E. epiphron* from the higher levels of the Simplon Pass a few miles distant, where *E. christi* does not occur. It was pointed out that the *epiphron* from the Laquintal resembled *christi* much more closely than did those from the Simplon. In the complete series of thirteen specimens from the latter locality there was not one example which could easily be confused with the latter species.

A LIVING EXAMPLE OF A LARGE SPIDER FROM TRINIDAD.—Mr. HUGH MAIN exhibited a large spider, *Avicularia* sp. ?, sent by Mr. F. W. Urich from Trinidad, together with the chitinous parts of a cockroach, *Periplaneta americana*, from which it abstracted all the nutritive parts, leaving the remains in a compressed globular form.

SOME VARIETIES OF BRITISH BUTTERFLIES.—Capt. W. B. L. MANLEY (a visitor) exhibited a number of British butterflies including :—*L. bellargus*, one nearly black specimen and a series of females to show the high percentage of var. *ceronus* ; some curious forms of *C. edusa* ; a series of *C. edusa* bred from 16 damaged var. *helice* consisting of 120 males, 58 typical females, and 66 var. *helice.*

Wednesday, March 19th, 1930.

Dr. K. JORDAN, President, in the Chair.

Obituary.

The PRESIDENT announced the death of Mr. F. V. Theobald.

Election of Fellows.

The following were elected Fellows of the Society :—ELWYN P. JONES, B.Sc., Dept. of Agricultural Zoology, The University, Edinburgh; A. M. CHAMPERNOWNE, c/o Lloyd's Bank, Pall Mall, S.W. 1; J. R. DIBB, 45, King George Avenue, Chapel Allerton, Leeds; A. G. GABRIEL, "Wilfadene," King's End, Ruislip, Middx.; E. G. GIBBINS, P.O. Box 41, Kampala, Uganda; HANNES HANNESSON, B.Sc., M.R.C.S., L.R.C.P., London Hospital, E. 1; W. D. HINCKS, 9, Grange Avenue, Chapeltown, Leeds; J. A. LAWSON, "Greenacre," Forest Row, Sussex; Dr. S. MADWAR, Molteno Institute, Cambridge; J. I. ROBERTS, M.Sc., The Medical Dept., Nairobi, Kenya Colony; DONALD T. RIES, Pennsylvania State College, Pa., U.S.A.; Major F. B. SCOTT, I.A., c/o Lloyd's Bank, Pall Mall, S.W. 1; FRANCIS A. SQUIRE, B.Sc., Dept. of Agricultural Zoology, The University, Edinburgh.

Odynerus callosus affording an instance of natural barriers against inbreeding.—Mr. O. H. Latter exhibited a stem of *Buddleia* used as a nesting site by an *O. callosus.* The stem, split longitudinally, showed the eight cells constructed within it; and the eight imagos were arranged in the order in which they had emerged. The nest was stocked by the parent *Odynerus* in April 1928. On July 21, 1928, there emerged four males; on July 25, three females, and on July 26, one female. Since the males were on the wing several days before the emergence of the females, it is extremely unlikely that mating between members of the same family would occur.

The cells were arranged in single file in a vertical column, and attention was directed to the fact that both the cells and their inmates showed a steady increase in size from the uppermost to the lowest: the first male to emerge (resulting from the last laid egg) was decidedly smaller than the fourth; and, similarly, the fourth female (product of the egg that was laid first) was distinctly larger than the first.

The exhibitor pointed out that research is needed to ascertain (1) whether in the case of these Solitary Wasps males result from the development of unfertilised ova; and (2) how the parent insect contrives to place male-producing ova in the smaller, less-provisioned cells at the top of the series, but female-producing ova in the larger, better-provisioned cells with which she commences the series.

Fabre has described similar phenomena among bees of the genus *Osmia*, and other Aculeate Hymenoptera, but arrived at no satisfactory explanation.

A Lasiocampid larva which bites slits in its finished cocoon, thus facilitating the emergence of the imago.—Prof. Poulton drew attention to the notes by Lt.-Col. F. P. Connor, I.M.S., on the behaviour of a Lasiocampid larva observed in 1918 at Basra (1919, *J. Bombay Nat. Hist. Soc.*, **26**: 691). One of these larvae started to make its cocoon on 23 October and finished it on the following day, when at 1 p.m. it " bit its way out at one end, started to make deep clefts in cocoon walls at two places opposite each other.

" The opening thus made was tested several times as regards size with great deliberation, the larva extending half its body out of the cocoon to assure itself that the vent was large enough. The two clefts were then lightly sealed on the inside with a tangle of soft silk."

The similar behaviour of three other caterpillars was also witnessed, and the author wrote, in conclusion, that—" It was a striking fact to observe how the larva, after all but completing the cocoon, always ' remembered ' to destroy part of its laboriously built home by biting out two deep clefts at one end, and how the valve-like door thus made was patiently tested several times to make certain of its being of the right size and then carefully closed on the inside with a little soft silk which would not interfere with the emergence of the imago."

The moths which emerged were submitted to the editors of the *Journal* and were believed to be *Taragama siva*, Lef., or a very closely allied race.

Prof. Poulton said that this most interesting instinct was unknown to his friend Mr. W. H. T. Tams and to himself.

The snake-like appearance of the S. American Sphingid larva of *Pholus labruscae*, L., enhanced by the modified caudal horn.—Prof. Poulton said that a most interesting eye-like motile plate, developed on the base of the caudal horn in this species, had been observed in 1883 at Callao and recorded in his diary by Commander J. J. Walker; later by the Rev. A. Miles Moss, who had published an account of the life-history of the larva in 1912, *Trans. Zool. Soc. Lond.*, **20**: 104, pl. XIII, *a–e*; XV, *k*.

Commander Walker had kindly permitted him to quote the following extracts from his diary. They relate to a larva found upon an *Ampelopsis*-like creeper, 13 January, 1883, when it was about three-quarters grown and in the penultimate stage. The words in brackets had been added by Commander Walker for the sake of clearness.

" Length, when crawling, about 3 ins.: of the usual *Choerocampa* shape, or perhaps a little stouter than is usual in larvae of that genus. Caudal horn slender, flexible, motile, curled at end . . . dark red in colour. Head rather small, greyish-brown, with a pale reversed V on the face. [General] colour [of body] rich olive-grey-brown, beautifully netted and veined with paler and darker shades: anterior segments slightly paler, with slender dark dorsal and subdorsal lines, and broad dark spiracular stripe: front edge of 4th segment pale ochreous-grey. A large round blackish ocellar spot, margined with pale ochreous-grey, paler in middle, and with a bluish central dot, on either side of the 5th segment: there is an indication of a similar spot on 4th segment, and both are enclosed in a long dark lateral blotch. Segments 6 to 12 have a broad, irregular-edged lateral band of a paler and warmer tint than the rest of the body: below this is a series of six oblique, irregularly-oval, pea-green blotches, enclosing the light pink-brown spiracles. Caudal horn situated on a round dark blotch, enclosing a whitish ring. Anal flap margined with pale brown: legs, prolegs, and under-side dusky-brown. In this stage it is a very striking and handsome caterpillar.

" It moulted about the 19th, and then grew very rapidly, attaining the length of 4½ inches when crawling. On the 23rd, it appeared to be full-fed: its colour being then slightly darker than before, with a pale brown transverse band on the front of segments 6 to 11 inclusive. The pea-green lateral blotches had entirely disappeared, being replaced by pale brown and appearing now as continuations of the pale lateral band: the ocellus on sides of segment 5 much more distinct than before, there being a sharply defined bright white dot above the centre (*i.e.* in the exact position of the ' high light ' in a drawing of an eye). The rudimentary ocellus on segment 4 had almost vanished. Dorsal line on segments 4 and 5 slender, bluish white. Caudal horn quite absent, but [in its place] on the 12th segment a large dull red-brown spot enclosing (subcentrally) a small, shining [circular] black motile plate, surrounded by a dark-brown ring. A broad pale stripe just above the feet on segments 2 to 5, enclosing several small brown irregular rings.

" When the larva is feeding, with the anterior segments slightly protruded, the shape of the fore part of the body, the mottled-brown skin, and the eye-spots, give the creature a most startling resemblance to the head and neck of a small serpent.

" Unfortunately this larva, after spinning a very slight web among some lichen, turned black and died [before assuming the pupal state]."

Commander Walker also noted that " the rapid movement of the shining circular dorsal plate on the 12th segment of this larva, when it was disturbed, could only be compared to the winking of the eye of a small bird or reptile."

Commander Walker had kindly directed his attention to the following passages in the paper (*ibid.*, pp. 105, 106) by the Rev. A. Miles Moss, who specially referred to the " formidable snake-like appearance " of the larva, and continued— " This effect is enhanced by a highly specialised form of tail, which consists of a delicate pink filament, similar to those known in *Cerura vinula,* but not sheathed and retractile as with the *Cerura* genus. More remarkable, however, and even unique, is the extraordinary power of rapid agitated movement which the larva can display in its tail when disturbed. Normally the tail stands erect, but curling and being easily bruised it loses much of its electric agility. . . .

" [Instar 4 : fig. *c*]—The strange tail-like appendage is retained, though looking less fresh in its pink colour, and in declining vigour tending to curl and become obsolete. . . .

" [Final Instar : fig. *d*]—Remarkably snake-like, either end appearing as the head of a snake. Sides ochreous, back rich sepia-brown in a strongly dentated brown band, culminating in segment 12, with an oval patch of light maroon, which contains an oval black ring, a black spot, and a metallic plate or disc. This latter replaces the absent pink filament, and is similarly capable of rapid palpitation, catching the light and flashing like a serpent's eye when molested. The dark ocelli in strong ochre are retained on segment 5 and the pear-shaped markings in outline on 6–11, but the green colour has entirely vanished."

Commander Walker had also informed him of the note on this larva in the Argentine, published in 1929 by Capt. K. J. Hayward (*Entom. Record,* **41** : 143–4). The remarkable modification of the caudal horn in the last stage is described as follows :—

" . . . On the penultimate segment a large spot, pinkish brown, edged with white containing centrally a black spot on a brown ground edged with chocolate brown and including on this brown space a curious process consisting of a twin round area of about one and a half to one and three-quarters of a square millimetre in area composed of a highly polished hard black substance set very slightly at an angle with one another and so arranged that when the larva oscillates this area by muscular action, these discs reflect the light in the same manner as a glass held to the sun, or a heliograph, so that the caterpillar appears to be flashing a light from its tail. . . .

" The whole appearance of this larva is reminiscent of certain poisonous snakes, and the natives refuse to touch it. With its head drawn back it is certainly a somewhat repulsive sight."

Although the caudal horn was movable in many Sphingid caterpillars * and also disappeared more or less completely in the final stage of many, its fate in the last stage of *Pholus labruscae* was of peculiar interest, as was the snake-like appearance at the posterior as well as the anterior end of the larva.

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* *Trans. Ent. Soc. Lond.*, **1885** : 303, 304. The slight movements of the caudal horn " synchronous with the contractions of the dorsal vessel," observed in *Sphinx ligustri,* L., were likely to be widespread and perhaps universal in the early stages of Sphingid larvae.

THE JASSID *NEPHOTETTIX BIPUNCTATUS*, F. (HOMOPTERA), AN UNPLEASANT AND PERSISTENT BITER WHEN ATTRACTED INTO HOUSES BY LIGHT.—Prof. POULTON said that he had received the following note on the habits of this species, from Mr. R. Senior White, F.E.S. :—

" 18 *February*, 1930.—With reference to your communication from Andrews in Vol. IV. Pt. ii, 1929, of *Proceedings of the Entomological Society* (p. 96) regarding JASSIDAE as blood-sucking insects—the same phenomenon is commonly encountered with *Nephotettix bipunctatus*, F., the " green-fly " of Calcutta, which appears in millions towards the beginning of the cold weather each year, in October–November.

" The species is strongly attracted to light in both sexes, and life is a purgatory during the month or so when the insects are on the wing. If they get between clothing and skin they bite viciously, but I have never been bitten on exposed skin, only when the insect is under clothing.

" Another interesting point is that they are much less strongly attracted to red light. This discovery was made about three years ago, and has been universally adopted even by small native shops, all lights being covered with red paper. Who made the discovery I do not know, and I have not seen it mentioned in any professional journal."

Prof. Poulton said that Mr. W. E. China had kindly directed his attention to Dr. J. G. Myers' interesting memoir on " Facultative Blood-sucking in Phytophagous Hemiptera " (1929, *Parasitology*, **21** : 472); also to a paper on " Some ' biting ' Leafhoppers " by Dr. Paul B. Lawson (*Ann. Ent. Soc. Amer.*, **91** : 73). Dr. Myers (*ibid.*, p. 474) had quoted from E. Brumpt (*Precis de Parasitologie*, 3rd ed., Paris, 1922, p. 815) a record of *Nephotettix bipunctatus* as a biter in India and the Philippines, but the facts brought forward by Mr. Senior White were a striking addition to our knowledge of its habits. Concerning " the effectiveness of red light in controlling the annoyance in the tropics," Mr. China had pointed out that this was doubtless due to the cutting off of " the ultra-violet rays which form the part of the spectrum actively responsible for the attraction of insects." Thus, he had " often noticed that electric arcs are far more efficient as light traps than the ordinary incandescent lamps."

One of the most interesting aspects of the subject, and one discussed by Dr. Myers in his paper, was its bearing on the evolution of parasitic blood-suckers in the Hemiptera.

AN APPEAL FOR UNIFORMITY OF USAGE IN NOMENCLATURE.—Prof. POULTON said that he had recently received a letter from his friend Prof. T. D. A. Cockerell, F.E.S., who hoped that the Society would consider the following suggestions which will also appear in a paper shortly to be published in America :—

" From the standpoint of nomenclature, I think that races or subspecies, though expressed by trinomials, should rank with species. That is, the racial name should not be repeated within the genus, and the first published name takes precedence, whether published as a species or as a subspecies. The intermediates found where the ranges of subspecies meet are presumably nearly always due to crossing.

" The mutation, aberration or form should I think stand in a different category. For various reasons, which I need not now discuss, it seems better (1) not to give priority as a specific name, when a named aberration has been found to belong to a species not hitherto separated; and (2) the use of the same term for parallel aberrations within the genus, or in races of one species, should be permitted and encouraged."

THE DRY SEASON HABITS OF TWO SPECIES OF *ANOPHELES* IN SOUTHERN RHODESIA.—Dr. H. S. LEESON said that the mosquitos dealt with in his investigations were *Anopheles funestus*, Giles, and *A. gambiae*, Giles (*costalis*, Theo.), as these were the species concerned in the transmission of malaria in Southern Rhodesia. Charts compiled from the numbers of adults captured showed a decided seasonal prevalence in both species. The peak of the curve in the case of *A. funestus* was attained in February and that for *A. gambiae* in March; but whereas the monthly collections of *A. funestus* diminished gradually during the dry season until December when adults were extremely rare, the collections of *A. gambiae* dropped rapidly to zero in June and remained so until December. In this month, about the beginning of the wet season, both species reappeared and increased in numbers until February and March. The problem was therefore to discover how they passed the winter or dry season.

A. funestus was the first to be found as a result of an intensive search. It was discovered hibernating buried away below the rocks in the dry, but still damp, beds of the Mazoe and other rivers. Most of the individuals were females containing almost fully developed eggs. In August the temperature rises, and the females leave their winter quarters and deposit their eggs in the neighbourhood of marshy ground and riverside puddles; after this they die, and by December no adults can be obtained, though many young larvae are found in the breeding-places. In January the new generation emerges.

In the case of *A. gambiae* the problem was entirely different, as its ordinary wet-season haunts yielded nothing. The hibernating sites of *A. funestus* and a great variety of other possible hiding-places also proved negative. It is probable, however, that this species requires a higher temperature particularly in the larval stage, and the exhibitor thought it would still be found breeding on the lower ground where higher temperatures prevail throughout the year. In June 1928 the low country was visited after having first ascertained that the mosquito had definitely vanished on the high ground. Along the Mazoe River *A. gambiae* was first taken at 1900 feet, but it was not till a descent to 1500 feet that larvae were collected. Thenceforward down to 1300 feet larvae, pupae and adults were abundant. Its disappearance at higher altitudes in the dry season is therefore thought to be due to the insects being killed by the drop in temperature at the end of the wet season, and its reappearance at 3600 feet in December to be consequent on the extension of the area of breeding due to the seasonal rise in temperature.

Charts and photographs were exhibited to illustrate the points discussed.

STRUCTURES ON THE 1ST AND 2ND ABDOMINAL SEGMENTS OF THE ADULT LARVAE OF *DREPANA CULTRARIA*, F., *D. BINARIA*, HUFN., AND *DICRANURA VINULA*, L. Mr. C. N. HAWKINS exhibited preserved larvae of the above-mentioned species, together with micro-photographs of their 1st and 2nd abdominal segments. After recalling that at a meeting of the Society held on the 16th Nov. 1927, Dr. E. A. Cockayne had drawn attention to certain prothoracic structures in the larva of *Platypteryx lacertinaria*, L., the exhibitor stated that additional similar structures of a different character are to be found in the adult larva of *Drepana cultraria.* These comprise two small projections beneath the 1st abdominal segment, one on each side of the central line, and two much smaller ones beneath the 2nd abdominal segment. The former pair are visible to the naked eye and occupy positions similar to those of the prolegs on abdominal segments 3, 4, 5 and 6, and are, roughly speaking, conical in shape, approaching cylindrical in the middle and tapering more abruptly near the apex, the basal portion being fleshy and the apex a dark chitinous point, while just above the tip there is, on the anterior aspect but slightly inwards, a tubercle bearing a single seta. The total length of the projections on the 1st abdominal segments in the preserved larva is just under $\frac{1}{100}$th inch (approximately ·2 mm.) The two very small projections beneath the 2nd abdominal segment are placed in the same relative position, but have no tip besides the seta-bearing tubercle, and may not therefore be in the same category. *D. binaria* larva has almost identical structures, but the seta-bearing tubercle on the projections of the 1st abdominal segment is situated more directly towards the front and the projections on the 2nd abdominal appear somewhat larger. Presumably these structures are included by Fracker in what he terms " chalazae " (1915, S. B. Fracker, " Classification of Lepidopterous Larvae," *Illinois Biol. Mon.*, **2** : 101), as to which he says, in dealing with his family PLATYPTERYGIDAE, " Setae usually borne on small chalazae, with great variation on ventral half of body, though never very numerous."

The exhibitor suggested that the structures now in question could hardly, in strictness, be regarded simply as " small tubercles," but, on the contrary, that they might be the remnants of prolegs not yet completely lost. If this interpretation were correct, the peculiar shape and attitude of these larvae, and the loss of the anal claspers, might have some bearing on the matter. In order to test this, the larva of *Dicranura vinula* was examined. This larva, although belonging to an entirely different family, is somewhat similar in shape and its anal prolegs no longer function as claspers. In this case there are, on each of the same two segments and in a direct line with the prolegs on each side, some dark-coloured spines, arranged roughly in circles surrounding slightly raised portions of the integument, and these spines resemble those round the lower portion of the basal joint of the prolegs. It was suggested that here, again, are traces of lost prolegs, and, if this is so, it may perhaps be regarded as lending some element of probability to the interpretation of the structures in *Drepana cultraria* and *D. binaria* referred to above.

Wednesday, April 2nd, 1930.

Dr. K. Jordan, President, in the Chair.

Obituary.

The death of Prof. E. G. R. Waters was announced.

Opening of new Meeting Room.

The Secretary announced that a conversazione would be held on the occasion of the opening of the Society's new Meeting Room on 7th May, in place of the Ordinary General Meeting, and that the Opening Ceremony would be performed by the Right Hon. Christopher Addison, M.D., M.P., Parliamentary Secretary, Ministry of Agriculture and Fisheries.

Gift of Epidiascope.

The Secretary reported that Mr. Robert Adkin had offered to present an epidiascope to the Society, and a vote of thanks was passed to him for his generosity.

Exhibits.

Larvae and adults of *Micromalthus debilis*, Lec.—Dr. W. H. Thorpe called attention to the remarkable life-history of this wood-feeding beetle belonging to the family Micromalthidae, as described by H. S. Barber (*Proc. Biol. Soc. Washington*, **26**, 1913; and *Ent. Mon. Mag.*, **49**: 243, 1913). Adults and two of the larval stages, the so-called "unsegmented stage," which reproduces by viviparous paedogenesis, and the "caraboid" dispersal stage, were exhibited.

The natural control of *Hyponomeuta padellus*, L.—Dr. W. H. Thorpe said :—

Hyponomeuta padellus, L. (*H. malinellus*, Zell.), the Ermine Moth, is of common occurrence upon hawthorn, blackthorn, apple and other rosaceous plants. While usually of no very great economic importance, it is liable in certain years to an enormous increase in numbers as a result of which it becomes a very serious problem for the fruit-grower.

In this country the worst epidemics of the apple form (*H. malinellus*) appear to have occurred in the Midlands. In Kent and Sussex the hawthorn form of this insect is common and widespread, although up to 1929 I had never observed any very heavy infestations. In May 1929, however, I came across a very large colony infesting a small area of stunted blackthorn bushes (*Prunus spinosa*) growing on the shingle of Dungeness beach at Jury's Gap, close to the Kent-Sussex boundary and some 300 yards from the shore. By the time the larvae were ready to pupate, the colony presented a most extraordinary sight. Over the whole area of perhaps half an acre there did not appear to be a single leaf left. The scrubby bushes were covered with webbing as with a grey sheet, and thousands of the larvae were dying of starvation. In their attempts to find food they had in many places covered the shingle and tufts of coarse grass in the neighbourhood of the bushes with their web.

This infestation at Jury's Gap was in a very exposed and isolated position on the open shingle beach, there probably being no other blackthorn or hawthorn bushes within a mile and possibly not within a much greater distance.

A few miles to the west, between Pett and Winchelsea, along the escarpment which marks the ancient shore line, are many blackthorn and hawthorn bushes growing under more normal conditions. Here numerous scattered colonies of *Hyponomeuta* were found, but nowhere were the insects particularly abundant. A large number of larvae were collected for experimental purposes from both localities. It was then found that whereas the larvae from the infestations near Winchelsea were parasitised to the extent of well over 45% by nine species of Hymenoptera, the parasitism of those from Jury's Gap was far below 1%; only one species, the polyembryonic Encyrtid, *Ageniaspis fuscicollis*, Dalm., being concerned.

From this it seems probable that the explanation of the great difference between the intensity of the infestation in the two areas lies in the different degree of parasitism, and previously Forsius * (1924) has brought forward evidence that parasites, particularly *Angitia armillata* and *Pimpla examinator* are a very important factor in the control of the allied species *H. euonymellus*, L. (*H. padi*, Zell.).† These facts seem worth recording in view of the great uncertainty in many cases as to whether parasites or non-living factors are the more important in keeping insects from excessive increase.

There appear to be two likely explanations to account for the absence of parasites from the Jury's Gap locality. Either the moths somehow became introduced into this isolated situation without their parasites, or else the lack of alternative hosts necessary for the development of some of the species accounts for their absence. It is also possible, though not very probable, that the exposed situation while harmless to the host was unfavourable to the activities of the parasites.

The list of specimens recorded from the Pett-Winchelsea infestation follows. I am greatly indebted to the late Dr. J. Waterston of the British Museum (Natural History) for the identifications.

ICHNEUMONOIDEA.

ICHNEUMONIDAE.

Herpestomus brunnicornis, Grav., *Pezomachus instabilis*, Forst., *Angitia armillata*, Grav., *Mesochorus confusus*, Holmgr.

BRACONIDAE.

Meteorus ictericus, Nees. (?)

CHALCIDOIDEA.

ENCYRTIDAE.

Ageniaspis fuscicollis, Dalm.

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* *Notulae Entomologicae*, **4**: 44–46, 1926.

† Further observations during the present season (1930) serve to confirm these conclusions. The Jury's Gap colony has practically starved itself out and many of the bushes have been killed outright. Although the infestation is thus negligible compared to the previous year, the percentage of parasitism is not appreciably greater than before. The numbers of *Hyponomeuta* at Pett and Winchelsea are approximately the same as in 1929. These two colonies offer therefore a striking example of the "damping" effect exerted by parasites on the oscillations in the numbers of their host.

PTEROMALIDAE.

Dibrachys cavus, Wlk.

EULOPHIDAE.

Eulophus amempsimus, Wlk., *Tetrastichus enonymellae*, Bch.

Of these *H. brunnicornis*, *A. armillata* and *A. fuscicollis* were the dominant forms and made up 80–90% of the total. *P. instabilis* and *M. confusus* are hyperparasites. *D. cavus*, which is in all probability identical with *D. boucheanus*, Ratz., may apparently act as either a primary or secondary according to circumstances.

Meteorus ictericus, of which only one specimen was obtained, does not appear to have been previously recorded from *Hyponomeuta*, although it is known from a wide range of Lepidopterous hosts. There is however the possibility that this specimen emerged from some other hawthorn-feeding lepidopterous larva although every care was taken to eliminate these from the sprays of food plant before placing these in the rearing cages.

In view of the possibility that the lack of alternative hosts was one of the reasons for the absence of the parasites from the beach, the host lists of the principal parasites are of interest. Since the species all emerged in May or June, and since *Hyponomeuta* is univoltine, it seems unlikely that the parasites could survive without going through a second generation on some other Lepidopterous larva. *H. brunnicornis* has so far only been recorded from the genus *Hyponomeuta*. An observation by Morley (*British Ichneumonidae*, **1**: 240) suggests that this insect passes the winter as an adult, for he records beating one from *Pinus sylvestris* early in April. Possibly in this case therefore there is not more than one generation per year.

Angitia armillata is known to parasitise some four British species of Lepidoptera apart from the genus *Hyponomeuta*. They are *Plutella maculipennis*, Curt., *Tephroclystia* (*Eupithecia*) *linariata*, F., *Fumea casta*, Pall., and *Thera* (*Hydriomena*) *juniperata*, L. From Morley's observation (*loc. cit.*, **5**: 196) of its emergence from a larva of the last named on 19th Feb., it seems fairly certain that the species is double-brooded. *P. maculipennis* by virtue of its two or three broods is the insect most likely to serve as the alternative host, and is also the one most likely to be available on the coast. But even though it is a common maritime insect capable of developing on such plants as *Salsola kali* (Chenopodiaceae) and on almost all Cruciferae, it is probably seldom present on the beach itself in very great numbers.

The remaining parasite of importance, *A. fuscicollis*, is probably independent of any alternative host, since its oviposition is effected in the egg of *Hyponomeuta*, and it is interesting that this should be the only species occurring at the Jury's Gap locality.

LIVING EXAMPLES OF *PHYLLOTOMA ACERIS*, KALT.—Mr. HUGH MAIN exhibited living specimens of the sawfly *Phyllotoma aceris*, Kaltenbach, which had just emerged from the small biconvex lenticular cocoons in which the larvae had hibernated. Usually the larvae do not pupate till a few weeks later in the year, the imagines emerging very soon afterwards, about the time when the Sycamore and Maple trees are in full leaf. The premature emergence was caused by an experiment tried about three weeks earlier to see if the larvae still retained their original ability to make the cocoons jump about like "Animated Confetti," as they have been called. The cocoons had remained quiescent in a cold room all the winter. A few were gently warmed, when they soon commenced to move about by the sudden jerks of the larva inside, after the manner of the better-known Jumping Bean of South America.

One side of the cocoon consists of a circular disc cut from the upper epidermis of a Sycamore leaf, towards the end of the summer, by the full-fed mining larva, which then spins a layer of silk attached to the edges of the disc, forming the other wall, thus enclosing itself. Small portions of the epidermis are left to keep the disc in position till the silken layer is completed. The larva then, by its sudden movements, causes the cocoon to become detached from the leaf, leaving a circular window in the upper epidermis, the lower epidermis remaining entire. After jumping about on the ground a suitable spot for hibernation is found, and the disc remains there till the following year. As in the case of some other sawflies, only the female is known. The insect is fairly common round London and also in other parts of the country.

DRAWINGS OF JAVAN AND SUMATRAN DIPTERA.—Mr. F. W. EDWARDS exhibited copies of illustrations published some years ago by Mr. E. Jacobson of the habits of certain Dutch East Indian Diptera, comprising (1) males of *Nerius fuscus* in fighting attitude; (2) *Harpagomyia splendens* being fed by an ant of the genus *Cremastogaster*. He remarked upon the scarcity of records of fights occurring among male insects.

Mr. K. G. BLAIR gave a résumé of his paper on "*Brachypsectra*—the solution of an entomological Enigma." He stated that a beetle closely allied to *B. fulva*, Lec., had recently been reared in India from larvae resembling the unidentified larva figured by H. S. Barber in 1905, and discussed its habits and systematic position.

Special Meeting, 7th May, 1930.

OPENING OF NEW MEETING ROOM.

Present:—Dr. K. JORDAN, President, in the Chair, the Right Hon. CHRISTOPHER ADDISON, M.D., M.P., 103 Fellows, and 43 guests.

DR. JORDAN, in introducing Dr. ADDISON, said:—

Ladies and Gentlemen, with to-night's ceremony we have arrived at a point in the history of the Entomological Society of London which is of great significance for the development of Entomology in the British Empire. The completion of this Meeting Room is the culminating step in the adaptation of this house to the needs of our Society, and deserves to be celebrated as an event of special importance. Entomology having become a science of public utility, the Council expresses the hope that other scientific bodies will avail themselves of this Meeting Room when suitable occasions arise, and has great pleasure in according to-night a most hearty welcome to the representatives of various Learned Societies and Institutes and other distinguished guests, who all confer an honour on us by taking part in these proceedings, and who by their presence testify to the interest which the study of insects has for all branches of biological science and for diverse spheres of human life. The pursuit of Entomology pure and applied extending to education, hygiene, agriculture and kindred subjects, it is most appropriate that this room should be inaugurated by a man versed in these many branches of human endeavour. The Right Honourable Dr. Addison, as Parliamentary Secretary to the Ministry of Agriculture in His Majesty's Government, as a member of the Medical Faculty and a research worker in morphology, and as Minister of Health and Parliamentary Secretary to the Ministry of Education in former Governments, has much sympathy with the labours of Entomologists and extensive knowledge of the importance of entomological research for the welfare of humanity, and we are very fortunate and happy that he has accepted the invitation to perform the office of inaugurator of this new room. I have much pleasure in calling on the Right Honourable Christopher Addison to address the Meeting. We shall listen to him with great attention.

Dr. CHRISTOPHER ADDISON said :—

Mr. President, Ladies and Gentlemen, there are obvious reasons why the Department of Agriculture with which I am associated should have a modest share in the proceedings of this evening. One cannot help but be glad that you have at last entered into these splendid premises. Although you have been a long time in growing, nearly 100 years—in fact, longer than any other Entomological Society save one—and notwithstanding the remarkable growth your society has shown of late, I venture to prophesy with a good deal of confidence that the growth will be vastly more rapid in the near future, because I think that people are only just beginning to wake up to the significance and the importance of the great group of sciences which are concealed under the word "Entomology." The public really has not yet awakened to the meaning of this science, but is rapidly awakening, and, I am sorry to say, neither have statesmen yet become fully alive to the importance of it, although it is now more and more frequently forced upon their attention.

Now, Sir, one of the duties which falls to me in my present office is to be a member of the Research Grants Committee of the Empire Marketing Board. This Committee had a meeting this afternoon which lasted two hours, and a considerable part of the proceedings related to researches in biological sciences, of which I may say truly that not more than two persons in the room understood the technical meaning or realised the economic significance of the lines of research for which grants were requested. We get applications from all parts of the British Empire. Half of the subjects this afternoon related to different branches of Zoology, particularly Entomology. Although these are hard times, the Empire Marketing Board spends more than £400,000 a year in aiding scientific research in one way or another. You might think that with such sums available it would all be plain sailing in the committee. By no means. The difficulty that we continually find presented to us by the heads of the different institutes to whom we turn for advice is the lack of researchers, men and women capable and sufficiently trained to do the work. I think our Universities have not as yet realised the enormous field there is in the

British Empire for people skilled in your subject and capable of carrying on researches which absolutely clamour for attention. (Hear, hear.) I assure you that at the Ministry of Agriculture and at the Empire Marketing Board we are sparing, and will continue to spare, no effort to bring this matter to their attention. When you come to think of it, is it not extraordinarily stupid still to spend vast sums of money on research of one kind or another which aims at the discovery of means to kill one another, while the insect is the real enemy which has to be fought? We have scarcely yet awakened to the realisation that upon the success of our fight with the insect and its kind depends the possibility of the utilisation of vast tracts of the earth. It is no exaggeration to say that in many parts of the earth which we have continually before us in matters affecting our own Empire, the possibility of cultivation, the possibility of living there, both as regards man and beast, depends upon the science you represent. (Hear, hear.) The last subject we discussed this afternoon was an application for a grant in aid of measures to get rid of pests which destroy the fruit and other crops in many of our Colonies and Dominions. The question of the harvesting of marketable crops in vast tracts of the Empire depends upon the application of the science of Entomology in one form or another. These problems of success or failure in cultivation are there all the time, and on the other hand, we are faced with a shortage in the number of people who can solve the problems. What is the reason of this difficulty? The first job I had in life was that of a Demonstrator in Anatomy at a salary of £120 a year, and I can tell you that that salary burnt into my soul. I was once offered a professorship—and I accepted it—at the entirely inadequate remuneration of £400 a year. It had not dawned upon University authorities in those days that, if they wanted to get people to do that kind of work, they had to give them sufficient income to enable them to live without constant anxiety. (Hear, hear.) There has been a great change in the University standards in that respect, but the change has not come down yet to the choice individuals who can do research work. These are very few in number in comparison with the nearly innumerable tasks before them. This country, I think, is not yet fully aware of the immense value the research worker has for the State, and that is why the number of trained people—at any rate, it is one of the reasons—is so much smaller than it ought to be. Indeed, in many respects the number of research workers is quite insufficient, and it is fair to say that some of the questions of the present time which urgently require solution are being held up, because there are not sufficient people trained in the different branches of Zoology, particularly in Entomology. It depends finally, of course, upon Societies like yours with your very widespread influence to help to educate public opinion. It is on this account that I consider the activities which centre in this building of such particular importance. But, Sir, I look forward, and I hope this society will look forward, with complete confidence to the future. The possibilities of the branch of science you represent have not yet been fully realised, or anything like realised, by our fellow-countrymen. But they will be recognised in time, for this science is almost limitless in its interests and in its economic importance. I esteem it a great pleasure to have the opportunity of expressing even these few amateurish thoughts before so distinguished an assembly, and it is a great honour to me to be allowed to declare this splendid Meeting Room open. (Loud applause.)

Dr. JORDAN, in thanking Dr. ADDISON, said :—

Dr. Addison, we have listened to you not only with attention, but also with great enjoyment. I thank you most heartily for the kind words addressed to us and through us to Entomology in general, and I express to you our gratitude for the service you have rendered to the Society by inaugurating this room. It is a very encouraging message you have delivered, and I venture to predict that Entomologists will respond not by mere promises, but by continuing to work hard, each in his special sphere of activity.

Ladies and Gentlemen, the inspection of this beautiful room may mislead some of our guests to consider Entomology a pretentious science and to think that ambition was the motive for the purchase of these premises and the building of this room. Entomologists, however, are of a retiring disposition, and ambition had little to do with these schemes, unless we use the word in its literal sense, as a derivation from *ambio*, to walk about or to canvass, in this case with hat in hand among the Fellows of the Society, who responded liberally and cheerfully. It was in reality the very inadequate accommodation for our library which started the idea of the acquisition of a house of our own. Perhaps a few of you still remember that years ago an attempt was made to find suitable quarters for the Society in the neighbourhood of Cavendish Square, the late H. Rowland-Brown and myself being delegated to make inquiries, which however led to nothing. The question became acute some years after the war, and in spite of opposition, the Council very wisely adopted the policy of the then treasurer, Mr. W. G. Sheldon, whose skilful management of the finances of the Society made it possible to purchase this house and in due course to proceed with the building of a Meeting Room. Whenever we look at these premises, or use the library, we shall remember the great services of Mr. Sheldon and the debt of gratitude we owe him. The room as originally planned was not as you see it; the Society could not have afforded to build such a unique Meeting Room, a copy of the famous Bromley Room at the Victoria and Albert Museum. The panelling, the ceiling, the dais and the President's chair are all gifts from one fellow of the Society, Mr. R. W. Lloyd. It is hardly possible to find adequate words for the expression of our indebtedness to Mr. Lloyd for his munificence; any words of thanks must fall flat with these presents before our eyes, and I will therefore only say that we are truly proud of the treasures with which Mr. Lloyd has endowed the Society.

It may have been my imagination, but I think I have seen some eyes roam about the room in search of something one expects to find in the Meeting Room of a learned Society, but which is not here. The anticipated large attendance at this function rendered it advisable to abstain from putting in position the epidiascope and screen which Mr. Robert Adkin is very generously presenting to the Society. We hope, however, that the beautiful instrument will be available for use at the first June meeting.

The building operations of which you see the result were not quite so simple as the uninitiated might think. Unforeseen difficulties were encountered which repeatedly caused delays and frequently meant additional expenditure; but we had in the chairman of the Housing Committee, Mr. E. C. Bedwell, an expert who knew how to deal with obstacles. We are under great obligation to him for his untiring devotion to the task in hand. Our heartiest thanks are likewise due to Mr. H. Willoughby Ellis for the installation of lighting and heating at a minimum cost, as well as to all fellows of the Society who have contributed so generously to the building fund.

We may justly pride ourselves on the fact that all has been accomplished without any financial help from outside the Society, and this fact might be taken for sufficient reason that we should now rest and enjoy the new acquisition. But the very possession of this treasure entails a further task, as is usual in life. Figuratively speaking, we have to adapt ourselves to so much beauty. Entomology has to live up to this imposing room!

As the highest esteem, at least in the abstract, is accorded to those whose services are considered to have been the most beneficial to mankind, I agree that Entomology should be judged by services rendered. But if any one should conclude from this general premise that Entomology must devote itself entirely to the study of those arthropods which we now know to be useful or injurious, I beg to disagree with such a narrow aspect of the work confronting the Entomologist. We get a wider view from a higher standpoint. There was a time when medical science mistook the outward manifestations of a particular disease for the disease itself, and there came the time when it was recognised that the disease was internal and caused by parasitic organisms. It is easy to see that the difficulties of hygiene would be largely solved if we were acquainted with the life-histories of all the actually, and potentially, parasitic organisms and their carriers. And similarly, humanity would be in a safe position in the battle with the world of insects, if all the insects and their habits were known to us. The general public has hardly any idea of the immensity of the toll insects levy on humanity: one species of flea, by transmitting bubonic plague from rat to man, has been instrumental in killing off in a couple of decades as many human beings as fell in the war, and the damage done every year to crops of various kinds and timber amounts to untold millions of pounds. There is the human species on one side and the insect world with its tremendous power of recuperation by means of great fecundity on the other. Which side will win in the end? Are we so sure of beating the insects? Do we prefer to pay tribute to them instead of organising an army of scientists to study the insects and to find means of reducing damage to a minimum? The few hundred Entomologists who can devote their whole time to research in museum and laboratory or in the field cannot cope with the millions of insect-species that crowd the earth and that, in many districts, make continued existence impossible for the human being; not even with the assistance rendered by private scientists who for the love of it devote their spare hours to the study of Entomology can sufficient relief possibly be brought to the overburdened official. Theoretically there is the remedy of appointing a large number of Entomologists, but in practice we are up against the difficulty of a dearth of candidates, as stated by Dr. Addison. The Universities, with some exceptions, leave Entomology severely alone and do not encourage any leaning towards that subject, and parents look with scorn at a career which, in their opinion, leads to nothing, as the salaries at home are so small. Indifference, ignorance and the materialistic basis of our present civilisation are at the root of this state of affairs. Higher salaries would certainly bring temporary relief, but like the ointment put on a pimple would not cure the disease. If contentment, happiness, is the goal of life, then we Entomologists can offer some advice. For, has not every one of us during his studies and through his studies encountered moments of intense satisfaction which lifted him above the humdrum aspect of life ? And when carrying out work with a definite object, have we not often regretted that the day has only twenty-four hours ? Love of one's work and pride of achievement are possessions of the highest value. If we could endow everyone with these possessions, the materialistic questions would recede into the background. It does not matter what kind of work it is and whether the tool is a microscope or a pickaxe; each line of work can be high class or low class, and if the mind is bent on high-class work, happiness will be the reward. The dearth of suitable candidates for entomological appointments, the low salaries offered at home and the unsatisfactory social level to which many an assistant is relegated need not make us despondent, however. The work is necessary for humanity, and as there are fortunately still many enthusiasts who put energy into the work, this accumulated and sustained energy will inevitably lead to reform; that being the way in which reforms originate. Meanwhile the human species remains exposed to the attacks of insects and as an aggregate is helpless. Humanity, like insects, is a manifestation of life expressed in individuals, some beautiful and indispensable, some mere males; but in contrast to insects, the acquisition of reason has led to a weakening of guiding instincts and man therefore is fitted for individualism and in the mass must be led or pushed. If you wish to lead a crowd, whether in the right direction or astray, take hold of the emotions. But which emotion can an Entomologist seize upon in order to achieve the reform desired by him ? As a lover of insects he does not wish to increase the fear and horror so many people show when meeting an insect, and which almost compels the ignorant to put his foot on an innocent beetle that happens to run across his path. What we should like to accomplish is to convert everybody into an ardent Entomologist, and as an authorisation for this attempt we might take the command in the Book of Books that the human being with a certain aversion from work should take a lesson from the ant, which of course cannot be done without a study of the habits of ants. Unfortunately, the example set by ants is far from edifying : robbery, slavery and such-like institutions which we try to eliminate from the code of ethics of humanity are rampant among ants and are there quite legitimate, inasmuch as at least some of the ant-species would perish without them. The habit of decapitating the soldiers, instead of giving them a pension when they have finished their task, is somewhat drastic, and, as a measure of retrenchment, might appear objectionable even to the Treasury. In an ant-state, however, where behaviour is regulated for every individual by the rigorous laws of instincts, to the exclusion of all sentiment and individual predilections, nothing is objectionable that conforms to these utilitarian laws. It is all a matter of habit; but, nevertheless, the kind-hearted Entomologists would never assist in promulgating such laws, nor of enforcing them.

There does not seem to be a short cut to acquiring in our day a knowledge of all the insect-species that people the earth, and we Entomologists will have to console ourselves with the thought that we can at least continue to plod on and to give gratis information to anybody who asks for it, and that as to the rest, we can follow the example of other people and put the blame on the Government of the day.

In conclusion, Ladies and Gentlemen, I have to draw your attention to two facts: firstly, that there is in the library an exhibition of various kinds of insects, which may be taken as exemplifying Pure Entomology, and secondly, that you will find in the office and in the Council room some refreshment, which may be partaken of as symbols of Applied Entomology.

Exhibits.

The Meeting was followed by a conversazione at which exhibits were made by Mr. H. St. J. K. Donisthorpe, Dr. W. H. Thorpe, Mr. Hugh Main, Mr. R. M. Prideaux, Colonel F. A. Labouchere, Mr. C. G. M. de Worms, Dr. G. D. Hale Carpenter, Professor E. B. Poulton, F.R.S., Mr. G. Talbot, Professor R. Stewart Macdougall, F.R.S.E., Mr. G. J. Arrow, Mr. J. F. Marshall, Dr. K. Jordan, Mr. J. C. F. Fryer, and Mr. B. P. Uvarov. Some of the rare and interesting works in the Society's Library were also exhibited.

Wednesday, June 4th, 1930.

MR. H. J. TURNER, Vice-President, in the Chair.

Congratulations to Sir Guy Marshall.

The CHAIRMAN proposed that the congratulations of the Society be offered to Sir Guy Marshall, whose name had figured in the recent list of Birthday Honours, and this was agreed with acclamation.

Obituary.

The CHAIRMAN announced the deaths of Dr. JAMES WATERSTON and of Mr. G. C. DUDGEON, Fellows of the Society.

Epidiascope.

Dr. NEAVE stated that the epidiascope generously presented by Mr. R. ADKIN had been ordered, and a similar instrument had been supplied on loan until its arrival.

Election of Fellows.

The following were elected Fellows of the Society:—A. G. DAINTREE, P.O. Box 797, Lourenço Marques, Portuguese East Africa; D. L. GLEGG, 9 Westleigh Avenue, Putney Hill, S.W. 15; H. S. LEESON, London School of Hygiene and Tropical Medicine, Keppel Street, W.C. 1; Miss MIRIAM ROTHSCHILD, 4 Palace Green, W. 8.

Exhibits.

NEW AND RARE SPECIES OF LEPIDOPTERA.—Mr. P. I. LATHY exhibited a number of new and rare butterflies, including *Charaxes fournieri*, Le Moult, a remarkable new species from the French Congo apparently allied to *C. acraeoides*, but having the coloration of a *Euphaedra*; a number of rare species and forms of the genus *Agrias*; and a new species of *Thecla* from North Peru.

OBSERVATIONS IN THE CAMEROONS (1910) BY MR. G. L. BATES ON THE BEHAVIOUR OF DOMESTIC FOWLS TOWARDS REJECTED SPECIMENS OF BUTTERFLIES AND ON THE

FLIGHT OF CERTAIN DIURNAL MOTHS.—Prof. POULTON said that he much regretted the delay in bringing forward these interesting observations and exhibiting the specimens referred to in the notes which had been kindly sent to him by Mr. W. F. H. Rosenberg in 1912. The material had been put aside for study, and when, in less than two years after receiving it, the war broke out, it was swept with so many other things into oblivion. Having recently come across the long-neglected notes and specimens, an early opportunity of exhibiting them had been sought.

Mr. Rosenberg, in forwarding the specimens, had written, 4 November, 1912 :—

" Being extremely interested in the subject, sometime ago I asked Mr. Bates to let me know of any observations he had made with regard to birds eating butterflies, and these are the specimens he sent in reply to that request. The notes under the specimens were written on the papers, and the type-written sheets (which I had prepared) are practically copies of those notes. Mr. Bates also wrote as follows :—

"' 1 *July*, 1910.—Before getting your last letter I had been in the habit of watching the poultry that sometimes came to pick up the rejected insects thrown out on the ground. These fowls were in general not very keen for butterflies or moths, though they were very greedy for grasshoppers that were thrown out. Most of the fowls never touch Lepidoptera after the first day or two. But the cock and the one-eyed hen thought butterflies worth taking, though they did not take them all, but selected certain ones, and often pecked and then abandoned certain kinds. I have put in papers with notes written on them some of the insects taken and refused by the fowls. Even the cock and the old one-eyed hen got tired of butterflies after awhile, but they never ceased to like the grasshoppers. The butterflies would lie on the ground until the ants carried them off, as they always did before the next morning. The only insect-eating wild birds that come around my house, except very small sunbirds and warblers, are sparrows, and the bulbul called *Pycnonotus gabonensis*. I never saw any of these pick up dead butterflies or catch crippled ones. Shrikes (*Lanius mackinnoni*) are sometimes bold and come near the house, and they might sometimes have come after the rejected butterflies, but they never did so. (Once I saw a shrike of the species named catch a beetle that I had thrown on the ground.) If ever I see a bird catch a butterfly I will tell you, but I never have seen one yet. But I must confess that I am not a good observer, and moreover I have not keen eyesight. I have to use a glass even to see common birds plainly.'

" I do not know whether observations of this kind with regard to domestic birds are of very much value, as their habits necessarily are somewhat modified in captivity, but still they are possibly of some interest. I especially noted that the fowls appeared to reject all the Acraeas [as shown on p. 39]."

In answer to my inquiry Mr. Rosenberg had written, 7 November, 1912, that he was unable to give the precise date of the observations, but that they were probably made, and the specimens collected, shortly before 1 July, 1910, when the above-quoted words were written. Confirmation was afforded by the date (28 May, 1910) recorded in the note on *Papilio tyndaraeus* (p. 39); also, but omitting the year, by May 11 on two other specimens and May 4 on a third.

In naming the specimens, some of which were naturally fragmentary, kind help was received from Dr. F. A. Dixey, Dr. K. Jordan, Mr. N. D. Riley, Mr. W. F. H. Rosenberg, and Mr. W. H. T. Tams.

The results of Mr. Bates' observations, which were made at Bitje, Ja River, South Cameroons, are shown in the following lists, I, II and III :—

I. *Butterflies eaten by the Fowls.*

Cymothoë jodutta, Westw., ♀ f. *ciceronis*, Ward (*seneca*, Kirb.), ♀.—This is the remainder of a butterfly eaten by fowls when thrown on the ground. They passed by the moths attached. [Specimens lost.]

Diestogyna barombina, Auriv., ♂.—This was being eaten by the one-eyed hen on coming to it the second time. The first time it was rejected.

Euryphene tentyris, Hew., ♂.—This was being eaten by the one-eyed hen after having been tasted and left once. May 11 [1910].

Euryphene tentyris, Hew., ♂.—Rescued from a hen. It would have been eaten.

Crenis amulia, Cram., ♂.—Rescued from the old one-eyed hen.

Crenis amulia, Cram., ♂.—Eaten by fowls. May 4 [1910].

Crenis trimeni, Auriv., f. *silvicola*, Schultze (*natalensis*, Boisd.), ♀.—Body eaten by old one-eyed hen.

Ergolis enotrea, Cram., ♂.—Body eaten by old blind hen.

Phrissura (*Appias*) *sabina*, Feld., ♂.—This wing was all that the old one-eyed hen left.

Papilio hesperus, Westw., ♂.—This was being eaten by a hen, and would have been finished.

II. *Butterflies and Moths rejected or neglected by the Fowls.*

The species indicated by an asterisk were rejected by 3 fowls that came to eat the insects thrown away; some of these were picked out and left, and all were in plain sight and left alone.

**Mycalesis medontias*, Hew., var. *obsoletus*, Holl., ♂.

Charaxes eupale, Drury, ♂.—Picked up and dropped again by a hen.

**Charaxes doubledayi*, Auriv., ♂.

**Euphaedra ruspina*, Hew., ♀.

Aterica galene, Brown, ♀.—Pecked at and then left by the one-eyed hen.

**Catuna oberthuri*, Rits., ♂.

**Pseudacraea lucretia*, Cram., ♂.

Cyrestis camillus, F., ♂.—This was passed by and looked at but not touched.

Vanessula milca, Hew., ♂.—Not touched.

**Planema epiprotea*, Btl., ♀.

Acraea zetes menippe, Drury, ♂.—Not touched.

Acraea zetes menippe, Drury, ♂.—Not eaten by fowls though several others lying by it were eaten.

Acraea zetes menippe, Drury, ♂.—Repeatedly passed and not touched by the one-eyed hen. May 11 [1910].

Acraea parrhasia, F., ♂.—Not touched.

**Glutophrissa* (*Appias*) *saba*, F. (*epaphia*, Cram.), ♂.

**Papilio nireus*, L., ♂.

Papilio tyndaraeus, F., ♂.—Picked up and dropped again by the cock. 28:v:10.

Papilio latreillanus theorini, Auriv., ♀.—Not touched.

**Papilio policenes*, Cram., ♂.

Aletis helcita, Clerck, ♀.—This moth, when thrown out on the ground, was repeatedly passed over by some fowls that at the same time ate the butterfly a bit of which is attached. [Piece lost.]

**Acropteris* sp. unnamed in B.M., near *erycinaria*, Guen., ♂.

It is of much interest to learn that, although fowls are not habitual enemies of butterflies, the conspicuous Acraeinae and the day-flying moth *Aletis helcita* were neglected by them, as they are known to be by truly insectivorous animals. The rejection of the Papilios (except *hesperus*) is also interesting in view of their generally conspicuous under surface and especially the red collar of the *tyndaraeus*. *Catuna*, the model for other Nymphalines, was also passed by as well as the mimetic *Euphaedra*, *Aterica*, and *Pseudacraea*. Among the species that were accepted the under surface of the *Diestogyna*, *Euryphene*, and probably *Crenis trimeni* is procryptic, as also is that of the rejected *Charaxes doubledayi*.

III. *Observations on the flight of certain conspicuous Day-flying Moths.*

Cartaletis variabilis, Butl., ♂.—This moth was caught flying in the air at mid-day with the sun shining. The boy did not see it [alight].

Aletis helcita, Clerck, ♀.—This moth was brought to me about 2 o'clock and must have been caught near mid-day. The boy found it perched on a ripe fruit of the *Musanga smithii*, which was lying on the ground, with its wings held erect over its back like a butterfly.

Aletis helcita, ♀.—Caught while flying in the air while the sun was shining.

Aletis helcita, ♀.—Caught flying in the air in the middle part of a bright day. The boy said he saw it alight and that it spread out its wings as other moths do.

Nyctemera phanax, Jord., ♀.—This moth was caught flying in the air in the middle part of a bright day. The boy did not see it alight.

Nyctemera phanax, Jord., ♀.—This moth was first seen by the boy who caught it flying about an hour before sunset. It settled on the underside of a leaf near the ground with the wings spread out in the manner of moths generally.

Nyctemera phanax, Jord., ♀.—This moth was caught flying in the air, near mid-day, when the sun was shining. The boy did not see it alight.

The two Geometrid species (Aletinae), enter, *Aletis helcita* being probably the centre, an important synaposematic combination which includes other day-flying moths of different specially protected families—Agaristidae and Hypsidae—; also *Euphaedra ruspina* and some forms of *E. eleus*, Drury. The similarity to the pattern of *Danaida chrysippus*, L., and its associates is probably beneficial to both combinations.

The notes on the Lymantrid *Nyctemera phanax* are of special interest, inasmuch as this moth is believed by Dr. Jordan to be one of the models of the female of *Charaxes lydiae*, Holl., and also of the female *Cymothoe beckeri*, H.-Sch. (III. Internat. Ent.-Kongr. Zurich, 1925, Weimar, 1926, **2**: 568, footnote 24).

Miss Jordan's beautiful photograph of the unique female *Charaxes lydiae* was exhibited to the meeting side by side with the three Nyctemeras, showing the remarkable resemblance in pattern. It was interesting to consider this instance of *Charaxes* mimicry in relation to the wonderful example exhibited by Mr. P. I. Lathy (p. 37).

It will be remembered that the first recognition of *Euphaedra* as a model of *Charaxes* is due to Dr. V. G. L. van Someren (*Ibid.*, p. 545; 1928, *Proc. Ent. Soc. Lond.*, **3**: 65), and it was very satisfactory to see, in *C. fournieri*, Le Moult, the resemblance to this genus developed in much greater detail and on both surfaces of the wings.

FURTHER CONFIRMATION OF THE OBSERVATION THAT DISTASTEFUL BUTTERFLIES ARE NOT EATEN BY INSECT PESTS.—Prof. POULTON said that his friend Mr. G. H. E. Hopkins, M.A., had written, 19 April, 1930:—"Some little while ago I sent a batch of butterflies home from E. Africa. On the way home they were attacked badly by mites, *but the Acraeas were not affected.*"

This observation supplied interesting confirmation of the following records and added the ACRAEINAE to the other specially protected butterflies found to be neglected by pests:—

H. W. Bates—Danaoid HELICONIDAE [ITHOMIINAE] (1862, *Trans. Linn. Soc. Lond.*, **23**: 510).

R. Meldola—*Danais* and *Euploea* (*Proc. Ent. Soc. Lond.*, **1877**: xii).

An interesting exception was furnished by a Peruvian collection made by Mr. G. H. Bullock, in which the DANAINAE and HELICONINAE had been specially attacked by beetle larvae (*Ibid.*, **1921**: xxxviii). The attacks on the scent-brands of male DANAINAE by house-ants belonged to a different category, being evidently specially directed to the fat known to be present in this part of the wing (*Ibid.*, **1907**: x; 1927, **2**: 58; 1928, **3**: 10, 49; 1913, *Trans. Ent. Soc. Lond.*, **1913**: 401).

THE LONG-EARED BAT *PLECOTUS AURITUS*, L., DEVOURING THE COMMON EARWIG (*FORFICULA AURICULARIA*, L.): INDIRECT EVIDENCE OF THE FLIGHT OF *F. AURICULARIA* ON COLD SPRING NIGHTS.—Prof. POULTON said that a Long-eared Bat habitually dined in the porch of 58 Banbury Road, Oxford, a house next door to his own, and by the kindness of his friend the Rev. W. Shirley, M.A., the owner, he was enabled to determine from the débris dropped on the steps the species of moths which had been devoured. This investigation, begun in 1928 (1929, *Proc. Zool. Soc. Lond.*, **1929**: 283–5, J), was continued systematically in 1929 and up to the present time. He had twice seen the bat suspended in the porch, thus confirming the inference, drawn from its meals and excreta, that it was a Long-ear.

During the cold spring of 1930 when moth-remains were absent from the porch or but rarely seen there, he was surprised to find numbers of the forceps of *F. auricularia* of both sexes. The male forceps were generally attached to a considerable section of the abdomen, the female sometimes to a slender connecting portion, but more generally entirely separate. It appeared certain that the female abdomen, perhaps because of a softer chitin and the greater food value of the contents, was more completely consumed than that of the male.

The following was a record of the débris collected on three days:—

2 *May*, 1930.—The wings of 1 *Taeniocampa gothica*, L., 2 pairs of ♂ forceps.

3 *May*, 1930.—Forceps: 7 pr. ♂, 1 pr. ♀ (components separate).

22 *May*, 1930.—Forceps: 3 pr. ♂ (1 separate), 10 pr. ♀ (1 attached as in males, 3 attached to small section of abdomen, 6 with components separate).

On 3 May I was told by the servant that she had previously swept up many of the pincers not knowing that they were of interest. As soon as the moths' wings began to appear in numbers the Forficulid forceps were absent from the débris.

My friend Mr. O. W. Richards, M.A., kindly made a microscopic examination of the pellets of excreta, finding Lepidopterous remains very finely broken up and fragments of chitin which were almost certainly Forficulid. No remains of Diptera could be traced.

The facts recorded above appeared to prove that the Common Earwig flies freely in the cold nights of spring, at any rate during those hours in which the Long-eared Bat seeks its food. In finding the following references to the flight of earwigs I have received much kind help from my friends Mr. B. M. Hobby, B.A., Dr. R. C. L. Perkins, F.R.S., and Commander J. J. Walker, M.A., F.L.S.

Westwood in the *Introduction to the Modern Classification of Insects*, Vol. I, 1839, p. 403, wrote of *F. auricularia* " coming abroad and feeding by night; at which time only they willingly expand their wings." He also quoted on pp. 403, 404, from the 1833, *Field Naturalist*, **1**: 131, the "proof of their flying by night, and occasionally in swarms, that in a small space, of 18 inches square, upon palings fresh coated with pitch on the preceding day, no less than fifty or more of these insects had been captured, some of which had still their wings expanded. . . ."

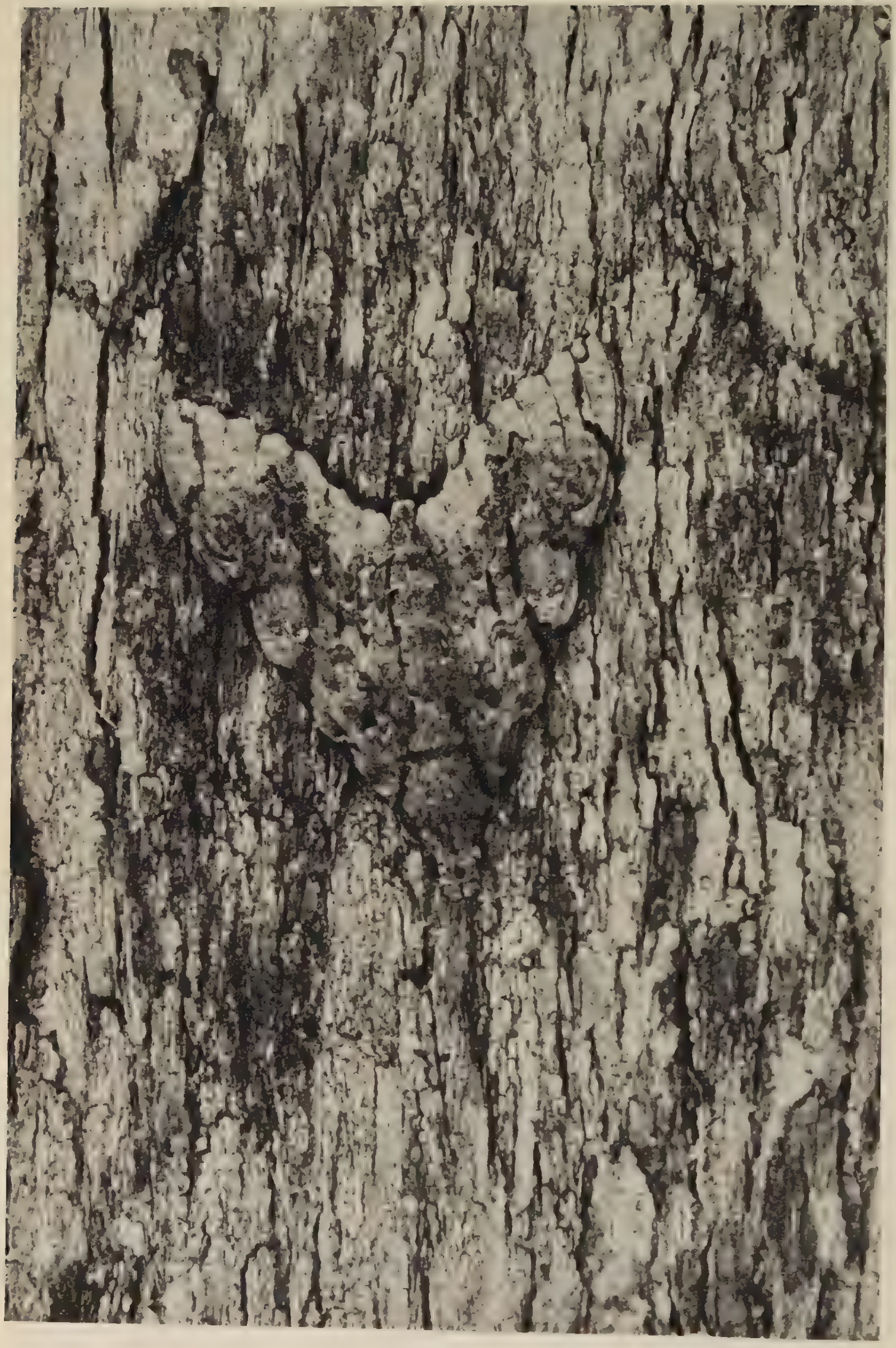
W. J. Lucas in *British Orthoptera* (Ray Society, 1920, pp. 50, 51) states that there are but few records of *F. auricularia* in flight. He refers to W. E. Collinge's observation of this species flying in at a window between 9.30 and 10.30 p.m. on two damp warm nights, 26 males having been observed entering (1908, *Journ. Econ. Biol.*, **3**: 2); also to the capture by W. D. Douglas of one specimen flying at night in his garden at Lee, August 1867, and to F. V. Theobald's suggestion that " the adults readily take to the wing on certain nights, especially when the moon is bright. Numbers later in the year used to fly into my house of a night, attracted by the lights " (1896, *Ent. Mon. Mag.* (2) **7**: 61).

Although the flight of *F. auricularia* has not often been witnessed, the smaller British species *Labia minor* has been commonly observed on the wing by day. Thus my friend Dr. R. C. L. Perkins, F.R.S., informs me that he has seen it " by scores together on special occasions and looking much like flying Staphylinids."

The nocturnal flight of certain Indian Forficulids appears to be well known. Thus Prof. Maxwell Lefroy records that *Labidura lividipes* and *L. riparia* " fly at night and come frequently to light, the only Forficulids observed to have this habit " (1909, *Indian Insect Life*, p. 52). Lt.-Col. F. Powell Connor, I.M.S., also states that " while at Amara in 1916 during the late summer months, large numbers of earwigs used to appear nightly round the tent lamps and run about the table during meals " (*J. Bombay Nat. Hist. Soc.*, **26**: 688).

Returning to the Common Earwig, it appeared probable that it was but little if at all attracted by light, and the occasions on which it has been seen entering houses might be explained by the presence of food and the sense of smell. Dr. R. C. L. Perkins wrote 6 May, 1930 :—

" If, as is probable, *F. auricularia* flies by night and is not attracted much by light one would have a poor chance of seeing it on the wing. I cannot remember that I have ever seen it flying. Looking at the extremely elaborate wings, it seems to me very unlikely that any insect would retain such highly developed organs, if it



H. B. COTT PHOT.

Natural size

Hawkmoth (*Xanthopan m. morgani*, ♀) at rest on bark of *Casuarina*: Beira, July, 1927 did not need to use them *habitually*. Most of the earwigs I have seen abroad, whether winged or not, are obviously nocturnal in their habits and lie up in their hiding places by day, though there are some exceptions to this where species frequent very wet districts in the tropics, or dense wet forests where the sun hardly penetrates."

As regards the indigestibility of the forceps of the Common Earwig, my friend Mr. B. B. Osmaston, C.I.E., has kindly given me the following account of his experience with a bird :—

"21 *May*, 1930.—The bird was a young Eastern White-spotted Blue-throat (*Cyanosylvia cyanecula abbotti*, Wolf) from Ladakh. I fed it on a mixed diet of mealworms and the common Oxford Earwig, of which there were hundreds apparently hibernating in the bird boxes in my garden.

"One day I was surprised to see the bird eject a large pellet, which on examination proved to be made up entirely of earwig 'pincers.' From memory I should say there were fully 20 pairs of such pincers in the one casting and possibly more.

"I was particularly interested in this as I had never seen it recorded that Passerine birds threw up pellets of indigestible materials, as is the rule with Raptorial birds, Kingfishers, Bee-eaters, etc."

THE HAWKMOTH *XANTHOPAN MORGANI MORGANI*, WALK., PHOTOGRAPHED AT REST ON THE TRUNK OF *CASUARINA* AT BEIRA, PORT. E. AFRICA.—Prof. POULTON exhibited the beautiful photograph taken by Mr. Hugh B. Cott, F.E.S., in July 1927, and reproduced, enlarged to the natural size, in the accompanying plate I. The female moth, which had been kindly brought to the meeting by the captor Mr. L. C. Bushby, F.E.S., was also exhibited and a slide prepared by Mr. Cott projected upon the screen. In a letter of 28 April Mr. Cott informed me that "the insect was photographed in its natural resting position, and was not disturbed or moved in any way. As you will see, the dark markings on the wings break up the hard outline of the F.W. costa and run in the correct direction—*i.e.* parallel with the cracks of the bark."

It was interesting to compare this splendid instance of procryptic appearance and attitude with the British examples, photographed by Mr. A. H. Hamm and reproduced in *Trans. Ent. Soc. Lond.*, **1906**, Pl. XXIX, which illustrate the same principles in equal detail, although on a smaller scale.

APOSEMATIC AND PROCRYPTIC APPEARANCE AND BEHAVIOUR OF CRABS OBSERVED AT BEIRA BY H. B. COTT.—Prof. POULTON who brought Mr. Cott's memoir on the Land-crab *Sesarma meinerti*, de Man (*Proc. Zool. Soc. Lond.*, **1929**: 679), presented by the author to the library, said that it was extremely interesting to compare the protective methods of Crustacea and Insects and to observe their similarity. The beautiful plate illustrating the warning attitude of the crab, was projected on the screen by the epidiascope, displaying the brilliantly red chelae held aloft, a conspicuous menace to any enemy. In answer to the question whether this crab sometimes throws off a claw which has seized an enemy, the hold being retained after separation, Mr. Cott wrote 28.iv.1930 as follows :—

"I cannot actually remember *S. meinerti* retaining its hold with a chela after that organ has been shed, but I have no doubt whatever that it can and does do so. *S. eulimene*, de Man, a much smaller form, very abundant in mangrove ditches at Beira, definitely behaves in this way,—that I can vouch for from personal experience on more than one occasion. The larger species is rather formidable, and I did not allow its chelae to take effect except accidentally ! "

Mr. Cott's second memoir (1930, *Proc. Zool. Soc. Lond.*, **1929** : 755) described and illustrated the procryptic habits of the Racing-crab *Ocypoda ceratophthalma*, Pallas, of Beira, forming a most interesting contrast with the *Sesarma*, as the author wrote in the letter referred to above :—

" These ' racers ' are precisely the colour of the sand on which they live, and from what I have seen of the creatures I am absolutely certain that they must derive great benefit from this circumstance. This is especially the case when the crabs squat in a hollow, when they easily escape notice (p. 759–61)."

THE NESTING ASSOCIATION OF BIRDS AND WASPS.—Prof. POULTON said that he had been informed by his friend Sir Guy Marshall that the nests they had seen together at Colenso, Natal, in 1905 (1929, *Proc. Ent. Soc. Lond.*, **4** : 88) were those of *Uraeginthus angolensis*, L., subsp. *niassensis*, Reich., and that the associated wasp-combs were those of *Belonogaster*.

FURTHER NOTES ON EDIBLE CATERPILLARS OF THE BELGIAN CONGO.—Prof. POULTON said that he had now received Miss Vinall's answer to his question about the larva of *Daphnis nerii*, L., the " Lontompito," placed among the edible caterpillars in the communication of 5 February, 1930 (1930, *Proc. Ent. Soc. Lond.*, **5** : 11, 12). Miss Vinall wrote as follows :—

" 22 *March*, 1930.—In reply to your letter of Jan. 13th, which by the way was three months en route, respecting the ' Lontompito ' or Oleander Hawkmoth, I find on further investigation that the caterpillar is *not* eaten either by Mongo or Ngombe peoples. They quite led me astray in the matter, and when questioning them they said, ' we thought as you were asking for caterpillars you would like these too,' but did not say they were not edible. The ' Nkulanjembo,' and ' Ebuluku,' and ' Elima,' of which I have sent you the moths, are all edible. I fear the remaining pupae may have died, as no moths have emerged, and they are now about nine months old. I will certainly make what observations I can on the ' Lontompito ' caterpillar when the season is here. I questioned my boys about it and they said ' it is a thing of fear itself,' to quote their words."

In a recently received consignment Miss Vinall included another Saturnian moth bred from an edible larva. The following note was written on the enclosing paper :— " Edible caterpillar : Native name ' Likanga.' Larva pupated 19.vii.1929 and moth emerged last week (?7.xii.), but I was too busy to look at them for days, so it died before unfolding its wings." The spinous larval skin, female pupa-case and eggs were enclosed with the female moth, which, in spite of its unexpanded condition, was identified by Mr. W. H. T. Tams as *Imbrasia epimethea*, Drury.

[A few days after the meeting of June 4 another letter arrived, written by Miss Vinall on 13 May, 1930, and containing the following additional information about the edible caterpillars :—" You will be interested to know that moths are emerging from the ' Belanga ' cocoon which was spun in an old tea-tin, about which I wrote you on August 31st last year [*Ibid.*, pp. 10, 11]. They are similar to one of the two kinds which emerged from the three communal cocoons sent you in June last year.*

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* " I rather expected that one of them would turn out to be the ' Belanga,' as these and the ' Beluku ' are the only edible caterpillars known to have communal nests in this district."

Five moths have already emerged; when all are out, I will send them to you, also the cocoon. I am enclosing in this letter a specimen moth, which is, as far as I can see, the same as those emerging now from the 'Belanga' cocoon, so that you may identify it. This I found one evening when walking round the station. 'Belanga' are eaten by the natives as a caterpillar and also in the *early* chrysalis stage, but not later. It is interesting that now we can identify both the 'Beluku' and 'Belanga' moths. Which is *Anaphe venata* [Beluku], and which *Anaphe panda* [Belanga]? The 'Belanga' larvae feed on a tree called 'Bolanga,' and only on that tree, so the natives tell me. ('Bolanga' is the singular form of the noun, and 'Belanga' the plural.) With this letter I am also enclosing a spray of leaves with some of the small fruit attached, of the 'Bolanga' tree [kindly identified by Dr. A. D. Cotton, Keeper of the Kew Herbarium, as *Bridelia micrantha*, Baill. (Euphorbiaceae)].

["I had quite a new piece of information from the natives to-day. In pointing to a *Cymothoe caenis* butterfly one of my boys said, 'That is called "Besankele"; it comes in clouds one time of the year, and makes people have headaches; we eat the caterpillar of the Besankele'—and then he showed me the tree on which they feed. I thought I would test this, so meeting some other Natives who have lately come to us from the eastern district, I questioned them as to the name of the white [Nymphaline] butterfly, and they immediately named it 'Besankele' and said that they eat its caterpillar. When I made the remark to my boys that I thought they said they didn't know the caterpillars turned into butterflies (they have only one general name for butterflies or moths) they replied, 'We knew about this one, but we didn't know about the others.' Personally I am doubting very much if *C. caenis* is the 'Besankele' caterpillar which they eat, as, so far, I have not found any of their edible caterpillars are from butterflies. I have asked them to bring me 'Besankele' caterpillars when they are in season, and I will try to breed from them to verify this. It will be interesting if it is true, but I very much question it.*

["I will certainly try to breed out some more 'Nkulanjembo' caterpillars [*ibid.*, p. 12], when the right time comes. The larvae are not difficult to get here, when in season."]

[Miss Vinall also pointed out in the same letter that the name of the tree on which the Bét'etó larvae feed should read "Bomposo," not "Bompose" (*ibid.*, pp. 10, 11), and that the year 1918 given in the footnote on p. 8 should have been 1928.—E.B.P., 16 July, 1930.]

Correction of an error in Trans. Ent. Soc. Lond., **77**: pt. II, Dec. 1929, pp. 493, 494.—Prof. Poulton said that he wished to express regret for the mistake he had made in the second name of his friend Dr. Hale Carpenter, quoting it as Dalton instead of Douglas, and suggesting it as the name of a Lycaenid subspecies. The mistake had arisen by confusing the familiar sequence of Sir Joseph Hooker's initials J. D. H. with the G. D. H. of Dr. Hale Carpenter's. He felt sure, however, that his friend would not object to the new race which he had discovered being now associated, although inadvertently, with the name of the great naturalist who had played a leading part in the foundation of Darwinian evolution.

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* The natives were right. Specimens of *C. caenis*, bred from the larvae they had pointed out, have now arrived and will be exhibited at a future meeting of the Society. E.B.P. 16 October, 1930.

A FURTHER NOTE ON *MUSCA AUTUMNALIS*, DE G. (*CORVINA, F.*) HIBERNATING AT ST. HELENS, I.W., IN 1929–30.—Prof. POULTON said that the six specimens of *Musca autumnalis* taken in December 1929 and exhibited to the Society 5 March, 1930 (1930, *Proc.*, **5**: 18) were all males, and it was therefore considered desirable to take a larger number and also to observe whether hibernation was still continuing during the Easter Vacation. He arrived at St. Helens on March 20 and almost at once immense numbers of the flies appeared on the windows nearest to the cistern-loft of which the trap-door remained open. The flies had evidently been disturbed by taking a candle into the loft, but, in spite of the unusually cold spring, were clearly ready to emerge from hibernation. Their numbers soon became annoying, and on 7 April it was determined to turn them out of the loft and into the garden. In the loft they were still found in hundreds, forming crowded patches between sheets of newspaper which lay on a wooden cistern cover. Eighty examples taken indiscriminately were made up of 32 ♂♂ and 48 ♀♀ of *autumnalis*. There was also in addition 1 ♀ *Pollenia rudis*, F.

DR. J. G. MYERS' OBSERVATION OF THE HEADLIKE POSTERIOR END OF AN ACHILID PLANT-HOPPER (HOMOPTERA) IN TRINIDAD.—Prof. POULTON said that he had unfortunately mislaid Dr. Myers' letter at the time when the Achilid, *Helicoptera longiceps*, Fowl., was exhibited to the Society (1929, *Proc. Ent. Soc. Lond.*, **4**: 49, 50). Having now found it, he had taken the first opportunity of bringing it before the Fellows :—

"7 *March*, 1929. *Off S. American coast.*

"Just before leaving Trinidad I sent you under separate cover (last week) a small Achilid plant-hopper which is one of the best examples of 'double endedness' I have seen. As in nearly all ACHILIDAE the tegmina overlap very considerably distally. In this case they are folded over and marked so as to resemble, it seems to me, the head of a Jassid leaf-hopper. I am rather accustomed to collecting Homoptera, but I mistook this one for a Jassid and killed it as such, and it was not until I came to mount it in the laboratory that I saw I had mistaken the tail for the head. I don't remember anything like it in the B.M. collection.

"The insect was caught in the Mora forest, near Sangre Grande, Trinidad—a forest remarkable among tropical woodlands for the dominance of one tree species, the Leguminous *Dimorphandra mora*.—J. G. M."

DR. J. G. MYERS ON THE EPIGAMIC BEHAVIOUR OF A MALE BUTTERFLY (*TERIAS*), AND THE GREGARIOUS HABIT DURING REST OF A HELICONINE BUTTERFLY, IN CUBA.—Prof. POULTON said that he had recently received some very interesting observations on insects, together with the specimens themselves, collected by his friend Dr. Myers in Cuba and Hayti. Dr. and Mrs. Myers had also been experimenting with insect food on the Carnivor *Nasua* (the Coati), in Trinidad, and their results were awaited with deep interest. Two of the Cuban observations were communicated at once, as it was hoped that other naturalists would be induced to look out for further instances of similar behaviour.

The male and female *Terias* (C. 23), referred to in Dr. Myers' note, were labelled "Soledad, Cienfuegos, Cuba: 31 July, 1929." With Mr. Gabriel's kind help the British Museum determination was found to be *Terias daira*, Godt., the male being the Wet Season f. *palmyra*, Poey, and the female the Wet Season f. *albina*, Poey. [Dr. Dixey who was unable to attend the meeting had kindly written—" *T. daira*, Godt. (1819), appears to be synonymous with *T. delia*, Cram., (1782). The Cuban representative of the assemblage belongs rather to the form *elathea*, Cram., (1779). Both forms are said by Cramer to have come from Virginia."]

" C. 23, *Butterfly courtship.*—The two were sitting side by side, the male on the left of the female, on a flower of *Sida* sp., which the female at least was sucking during the whole time of the observation, but I am not sure whether the male was also doing so. The wings of both were closely folded above their backs and appressed to each other in the usual manner. Suddenly the male began to fidget with the right fore-wing and eventually he jerked it from behind the hind-wing and stretched it downwards, forwards and towards the head of the female, the active wing being in such a position in front of the head as to appear dislocated. Meanwhile pairing was attempted unsuccessfully. After about a minute the female flew away and settled on a leaf. The male then flew also, fluttered about the vicinity, approached another male that was flying apparently aimlessly, and then went to the female. This time he settled again exactly alongside, with axes parallel, but at the opposite side and used the corresponding fore-wing as a fan, disengaging it first in the same manner, and expanding and approaching the tip of the abdomen. The female seemed to take no notice, even after a minute; and I then captured them. I could detect no scent. The black and orange bar on the male's fore-wing is most conspicuous when the fanning takes place."

[Referring to this most interesting observation Dr. Dixey had written the following note on scent in the genus *Terias* :—

" With regard to its scent-producing and scent-distributing apparatus, the genus *Terias* falls into three sections; two of which are characterised by the possession, in the males, of definite scent-streaks or scent-patches on the wings; while from the third, to which all the American species belong, structures of this kind are absent. There is nevertheless good evidence that the males of several members of this latter section are capable of producing and diffusing a fragrant odour, compared by Dr. G. B. Longstaff to that of Pink Bind-weed (*Convolvulus arvensis*, Linn.). The American species in which the results obtained by him were positive were *T. euterpe*, Ménét., *nise*, Cram., *messalina*, Fabr., and *westwoodi*, Boisd. A similar scent was found in *T. libythea*, Fabr., an Eastern member of the same section. The species which is the subject of Dr. J. G. Myers' observation, and in which he detected no scent, was tested (under the name of *T. delia*, Cram.) by Dr. Longstaff, whose results were conflicting, but in the large majority of cases negative. (See *Butterfly Hunting in Many Lands*, 1912, pp. 509, 510.)

" Observations on the scent of the other two sections, typified respectively by *T. hecabe*, Linn., and *T. laeta*, Boisd., are few. Dr. Longstaff failed on several occasions to detect any scent in *T. hecabe* and its allies; the present writer, however, found a faint but distinct odour in two males of *T. hecabe*, and also on scraping the scent-patches of a male *T. lineata*, Misk., a member of the *laeta* group. These observations, first made in Magnetic Island off the coast of Queensland, were confirmed on specimens caught at Kuranda, and again (in part) at Thursday Island, Torres Straits. One positive and several negative results were obtained with *T. silhetana*, Wallace (*hecabe* group), at Kandy, Ceylon (1916, *Ent. Mon. Mag.* (3), **2**: 47–49, 121).

"It is evident from the observations above recorded that the behaviour of the male *Terias* observed by Dr. Myers may well have had the object of shedding perfume for the benefit of the female. The remark that he makes as to the conspicuous appearance of the black and orange bar when the fanning takes place, may suggest that a visual element enters into the process of courtship; but there is clearly no reason to suppose that the absence of a scent-patch in this species implies the absence of the power of shedding odour.—F. A. D., 9.vi.1930."]

The Cuban specimens (C. 265) which form the subject of Dr. Myers' second communication were *Heliconius charithonia charithonia*, L., 3 ♂ 3 ♀, observed 13 October, 1929, in the same locality as that in which the ♂ and ♀ *Terias* were taken.

"C. 265, *Butterflies sleeping together*.—About 4 p.m. I saw three or four individuals fluttering round the tips of a dead twiggy branch overhanging the water of a large shaded creek. Ten minutes later six of them were hanging, almost touching, to the twigs and a seventh and eighth were flying round. I caught five with one sweep of the net, and the sixth returned and settled with wings closed and depending while I was taking these from the net. They could hardly be of the same brood, for some were much worn while others were quite fresh. I send you all these."

It was of much interest to find the HELICONINAE exhibiting the instinct which has often been observed in another great specially protected group—the DANAINAE. In some instances similarity of behaviour even extended to the selection of dead and withered twigs, as recorded by Mr. G. H. E. Hopkins and Mr. P. A. Buxton in Samoa (1926, *Proc. Ent. Soc. Lond.*, **1**: 35, 48). On the other hand males only were observed to congregate in these latter instances, both sexes in the first-mentioned, as also it was to be believed in other DANAINAE such as *Danaida plexippus*, F., and *D. genutia*, Cram., (1905, *Trans. Ent. Soc. Lond.*, **1905**: 92); probably also in the Ethiopian Danaines which manifest a gregarious tendency when going to rest. Dr. W. A. Lamborn, O.B.E., had recently kindly told him that he had observed this tendency in *Amauris ochlea*, Boisd., at Bagamoyo, Tang. Terr., *A. n. niavius*. L., in S. Nigeria; and *Danaida chrysippus*, L., in Nyasaland. Dr. F. A. Dixey, F.R.S., had also kindly informed him of the following observation:—"At Townsville, Queensland, on Sept. 8th, 1914, the late Mr. W. Bateson drew my attention to a tree where *Tirumala hamata*, McLeay, and *Euploea corinna*, McLeay, were going to roost in extraordinary numbers. The time was the late afternoon, and several of the butterflies kept up a constant fluttering before finally settling down for the night.—F. A. D."

An increased conspicuousness in specially protected species seems to be the most probable interpretation of the behaviour described above as it is of so many manifestations of the gregarious instinct in insects.

MRS. D. R. FYSON'S OBSERVATIONS ON THE EPIGAMIC BEHAVIOUR OF THE MALE DANAINE BUTTERFLY *EUPLOEA CORE*, L., IN MADRAS.—Mrs. FYSON, who was present as a visitor, gave the following account of her observations, confirming and extending those recently made by Mr. H. G. Champion (1930, *Proc. Ent. Soc. Lond.*, **5**: 14, 15):—

" *Madras.* 10 *March*, 1930. 1.45 *to* 2 *p.m.*

" I had strolled into the garden after lunch, with a net, to see if anything was about. I had just caught a *Euploea core*, and was extracting him from the net when I noticed another, flying low, a yard or two ahead, and the sun glinted on his yellow brushes. So I stood still and watched. He was flying more or less in a circle, over an almost bare patch of ground not more than 3 yards in diameter. Occasionally he made a hovering flight across, and then I could see clearly his tail pointing downwards, well clear of the wings, and the two brushes protruding. There was a bank of succulents on one side and a large tree-trunk on the other, so the space was confined and partially shady, but foliage being thin at this season, the sun shone through. There were three interruptions :—

" 1. Another *Euploea core* joined him and they fluttered rapidly round each other and upwards among the branches of the tree, but one, presumably the original male, soon returned alone and continued his circular flight.

" 2. A *Junonia* invaded his territory, but with a few quick flights the *Euploea* apparently chased him away and then returned to his circle.

" 3. He settled for a few seconds on a palm-leaf, but on the further edge of the circle, and I could not see the brushes.

" I did not time the whole manœuvre but I should guess it at about five minutes. I refrained from capture hoping for further developments, but eventually he flew away, and though I waited in the vicinity for another 15 minutes he did not return.

" After writing the above account I watched the same manoeuvre in another part of the garden, a few days later :—

" 13 *March*, 1930.—The drive is shaded by tall trees and bordered by a low clipped hedge on either side. I approached across the grass and stood behind the hedge. A *Euploea core* was flying over the drive in a circle the diameter of which was about the width of the road. His circles were less regular than those observed on March 10, but the space was more open. The brushes protruded, and the flight continued for two minutes after I came upon it. The *Euploea* then flew right away.—D. R. F."

Prof. POULTON said that it was much to be hoped that these observations on *E. core* and other species of *Euploea* and *Danais* would be continued and throw further light upon the details of epigamic behaviour. He did not doubt that a female *Euploea* was present or had recently been present at the places where the males had been seen flying and protruding their brushes.

MONSIEUR POUYANNE'S FURTHER OBSERVATIONS IN ALGERIA ON THE FERTILISATION OF ORCHIDS BY MALE BEES.—Prof. POULTON said that his friend Col. M. J. Godfery, F.L.S., had kindly sent the following account of M. Pouyanne's interesting observations, together with two of the male bees which had been doubtfully determined as *Andrena fulvicrus*, Klug, in the Paris Museum.

" On the 11th Feb., 1930, the first warm day of spring after a cold wet winter, Monsieur Pouyanne,* President of the Court of Appeal, Alger, was walking in the Bois de Boulogne, a pine wood about 5 kilom. from the town, when he noticed a swarm of little insects dancing in the sun above a talus by the side of the path, but not quitting its neighbourhood. He realised that he was in the presence of a 'ballet' of male Hymenoptera above the bank from which the females would later emerge. He at once resolved to search for *Ophrys fusca*, Link, which is scarce and grows singly near Alger, found three spikes and placed them in 'le beau milieu' of the dance. Success was as complete as unexpected. The insects came to the flowers and carried off the pollinia on the end of the abdomen. They returned to the flowers again and again, and hustled each other to secure a place. A second insect sometimes alighted on one already in position, and a third on the top of the latter. The first one, however, clung tightly to the labellum, and held on till the others went away.

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* An abstract of Monsieur Pouyanne's and Col. Godfery's earlier observations, together with references, appeared in 1927, *Proc. Ent. Soc. Lond.*, **2**: 31; Mrs. Coleman's account of the analogous behaviour of a male Ichneumonid in Australia, in 1928, *Trans. Ent. Soc. Lond.*, **76**: 533, and 1930, *Proc. Ent. Soc. Lond.*, **5**: 15.

"The bees were so intent that M. Pouyanne took a spike of *O. fusca* in his hand, and watched their actions through good spectacles. The proboscis was not brought into play, nor was any part of the flower gnawed. The tip of the abdomen was plunged into the cavity at the base of the lip, and rubbed against the floor and sides of the cavity, which are covered with very short and very fine hairs. The insects sometimes made a half turn in the air, so as to alight head downwards on the lip, but sometimes alighted head uppermost, and instantly turned round and assumed the reversed position. For forty years M. Pouyanne had been seeking an opportunity to discover the insects which visit *Ophrys fusca*, but had only once seen a fugitive visit paid, years ago, at Blida.

"On Feb. 24th in the same place, he saw exactly the same thing, but the insects were fewer and less keen. He then exposed *O. lutea*, Cav. (whose flowers are constructed on exactly the same plan) instead of *O. fusca*, but the insects paid no attention to the former. On placing two or three spikes of *O. fusca* amongst the *O. lutea*, the insects came to the former but ignored the latter.

"On March 3rd similar experiments were made on another swarm about 1 kilom. away, across a ravine, when exactly the same phenomena were observed, *O. fusca* being visited, *O. lutea* left alone. Nevertheless *one* insect visited a flower of the latter, and carried off the pollinia on the tip of the abdomen, showing how rarely a hybrid is likely to arise between these two species, at least as far as *A. fulvicrus* is concerned.

"The bees caught visiting *O. fusca* at Hyères were *Andrena trimmerana*, Kirby, ♂, and *A. nigroaenea*, var. *nigrosericea*, Dours, ♂ (*J. Botany*, **1925**: 39). Vague as is the resemblance of the lip-markings to a female *Andrena*, it is sufficient to attract three different species of that genus. This may explain its long period of flowering, and perhaps the large-flowered form found near the sea in April may be visited by a larger species of *Andrena*, emerging later.

"M. Pouyanne observed very clearly that the enthusiasm of *A. fulvicrus* for *O. fusca* rapidly cooled as time went on. In his latest observations, after about twenty minutes, the insects ceased to visit the flowers. Surprised into eagerness at first, they soon appeared to perceive that they were victims of an illusion, and became tired of the flowers rather quickly.

"In the second week of April in the same stations, the assemblies of *A. fulvicrus* were replaced by gatherings of *A. nigro-olivacea*, Dours, which visits *O. lutea*. On exposing flowers of the latter, the same success was obtained as with *O. fusca* in the case of *A. fulvicrus*. An old spike of *O. fusca* with one presentable flower was then placed in position, and was as successful as *O. lutea* in attracting the insects. If *A. fulvicrus* confines itself to *O. fusca*, and *A. nigro-olivacea* to *O. lutea*, this is probably due to the period of emergence of the males coinciding with the time of flowering of the species of *Ophrys* concerned. M. Pouyanne once caught a small *Halictus* with two pollinia on the tip of the abdomen, which could only have been those of *O. fusca* or *O. lutea*.

" He several times observed that when an *Andrena* alighted on a flower, whether of *O. fusca* or *O. lutea*, two, three or even four others would immediately precipitate themselves on the same flower. He was led to believe that, whilst the first visitor treated the flower as if it were a female, each of the others did the same to the one beneath him. He transferred two of them acting thus to a glass vessel, in which they remained interlocked for a minute or two. The uppermost insect continuing the customary movements, M. Pouyanne believed that the lower was a female, and was astonished to find when they separated that it also was a male.—M. J. Godfery."

Two of the male bees observed by M. Pouyanne had been kindly sent by him and were exhibited to the meeting. Inasmuch as the determination was doubtful they had been submitted, together with similar specimens from the Morice Coll., to Dr. R. C. L. Perkins, F.R.S., who wrote on 6 May, 1930 :—

" I think all the bees sent are *A. fulvicrus*, Klug,—now called by the earlier name *flavipes*, Panz. They are inferior in appearance to our Devon specimens, but in all essential *fulvicrus* characters they agree. In the one with the genitalia exposed these organs are characteristic of *fulvicrus*, not only in the form of the exterior outline of the processes of the stipites, which form is unusual, but also in that the usually highly polished surface of the basal parts of these are not polished, but under a strong lens very evidently sculptured—a *very rare* character in *Andrena*. Except that the abdominal hair-bands are not so well developed as in most Devon specimens I see no difference. The long ventral clothing of hair without bands of cilia on the sternites apically, the long hairs being themselves curved apically, are *fulvicrus*-like ; so are the antennae. No doubt *fulvicrus* is susceptible to some local variation under different conditions since its 2nd brood in this country was described as a new species by F. Smith ! but in my opinion the specimens sent are strictly within the range of variation of this species. It is a pity *fulvicrus* does not occur at Wotton-under-Edge, as I know places where the bee-, fly- and other local orchids grow and one might make some observations. Here I never see these flowers, but plenty of *fulvicrus* ! The nearest approach to the abdominal clothing of your Andrenas I find in some of my Roumanian specimens and in some 2nd brood British ones of *fulvicrus*, which is perhaps what one would expect. In Hawaii the (introduced) *Pieris rapae* produces only the summer forms and I never saw the spring form, though probably this would occur at 10,000 feet in the mountains if there were food there for the larvae—but of course there is none."

A few days later Dr. Perkins examined the bees in a better light and wrote :—

" 9 *May*, 1930.—I see no reason to alter my opinion of a few days ago. I have not yet, however, compared them actually with all the *fulvicrus*-like species I possess ; nor do I find anything I have, very near *fulvicrus*, except the British (and European) species Saunders called *fasciata* (= *gravida*), so that I wonder whether Morice was right when he informed me that most of the banded desert Andrenas were allied to *fulvicrus*. It is a pity you have no ♀ of your bee, as it would probably settle the matter whether the orchid-visiting bee is (1) a very closely allied but distinct species, or (2) a slight but distinct race of *fulvicrus*, or (3) a slight ♂ variation only—possibly not constant in a series of specimens. My Roumanian specimens which Montandon sent me years ago are in poor condition, but look more like the typical British specimens than yours. They are all ♂♂."

ATTACKS OF BIRDS UPON BUTTERFLIES.—Dr. G. D. HALE CARPENTER exhibited a female specimen of *Amauris echeria* f. *jacksoni*, E. M. Sharpe, taken on Dec. 22nd, 1928, on the Uganda side of Mt. Elgon at an elevation of about 7000 feet. This butterfly bears no less than eight separate imprints of the beak of a bird, of which six, directed obliquely from in front backwards and outwards, are very clearly defined, and two, directed from behind, are less distinct. There are three along the outer margin of the right fore-wing, one in front of the other directed backwards, and another directed forwards about halfway between the apex of the cell and the tip of the wing, with its end at the costal margin. A similar impression is on the left fore-wing, and perhaps these two are the marks of one bite when the wings were apposed. The left fore-wing bears an extremely clear impression directed obliquely backwards and outwards, with its tip at about the centre of the outer margin. Each hind-wing, at the anterior angle bears a mark directed backwards: the two marks, however, would not coincide if the wings were apposed. There is evidence of repeated attacks made both when the wings were apposed, and on separate wings, yet the wings are not torn; only the surface of the right fore-wing is rubbed at the apex. This remarkable specimen shows, firstly, that repeated attacks were made to capture it; secondly, that it was distasteful, as it is impossible to believe that it broke away from the bird, and thirdly, it well exemplifies the impunity with which an aposematic species meets attacks.

A NEW FORM OF *PSEUDACRAEA EURYTUS*.—Dr. G. D. HALE CARPENTER said that considerable attention has been directed to the members of a well-defined association of butterflies in the neighbourhood of Entebbe, and other parts of Uganda, which have a simple aposematic colour scheme consisting of dark ground-colour with a broad orange band crossing the fore-wing and a white band on the hind-wing. This association centres round the male of *Planema macarista*, E. M. Sharpe, and both sexes of *Planema poggei nelsoni*, Gr.-Sm. There are slight differences between the two species of *Planema*: in *macarista* the orange band is of a deeper tint than in *poggei*, while it is set more obliquely across the wing in the latter. These differences are faithfully copied in two forms of the polymorphic mimetic Nymphaline *Pseudacraea eurytus*, L., the male form *hobleyi*, Neave, resembling the male *macarista*, while the female form *poggeoides*, Poulton, equally closely resembles both sexes of *poggei*.

Another species of *Pseudacraea*, *P. künowi neumanni*, Thurau (= *hypoxantha*, Jord.) has in both sexes a richly coloured orange band whose shape is distinctly different from that of *macarista*, being more sharply elbowed at its outer angle and much narrowed anteriorly. The obliquity of the band suggests that this species mimics *poggei* rather than *macarista*, but the orange colour is nearer that of *macarista*. It is a larger and more robust species than the forms of *eurytus*.

Explanation of Plate V.

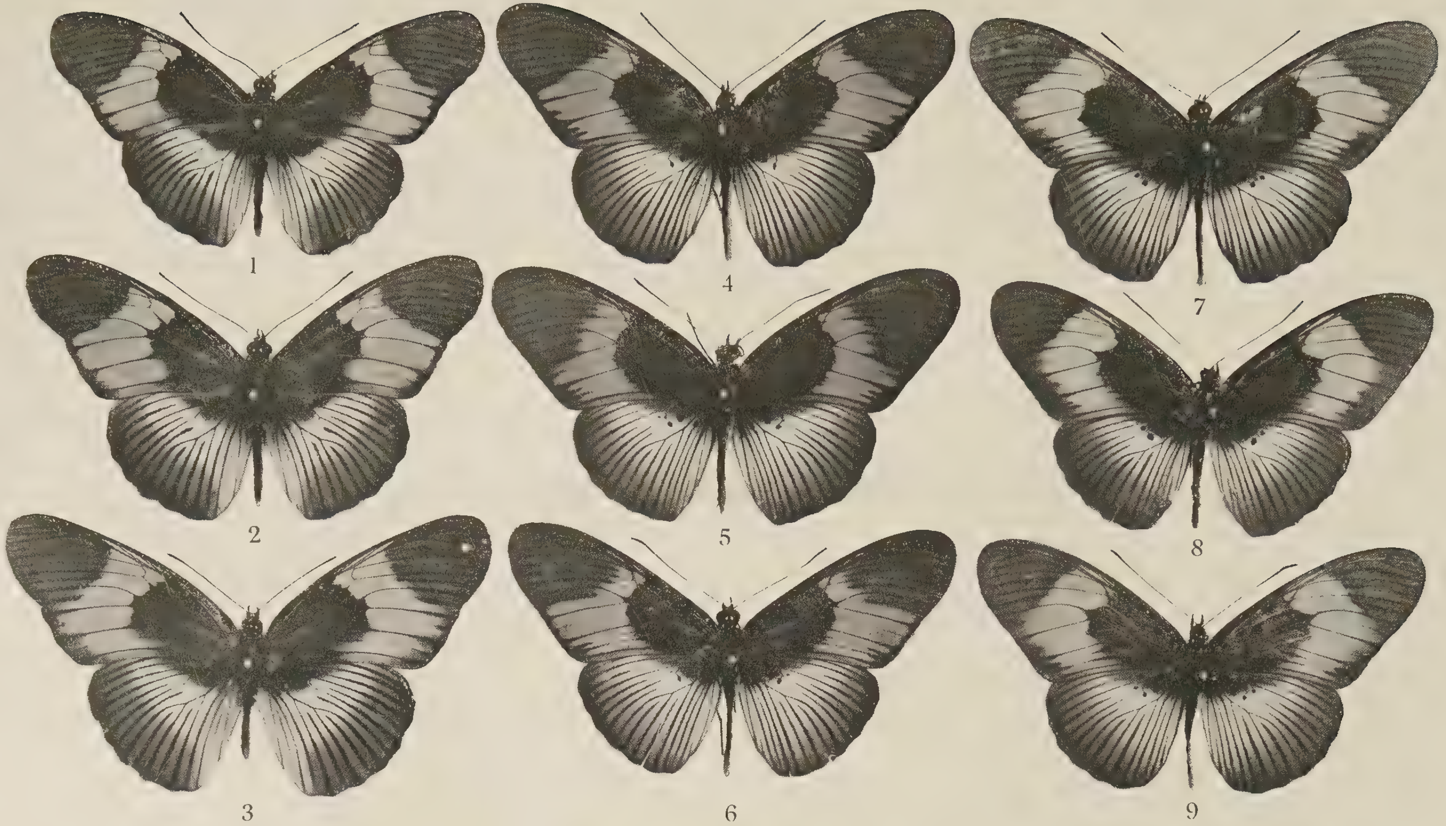
Figs. 1–3. *Pseudacraea künowi neumanni*, Thurau, two males and a female.
4–6. *Pseudacraea eurytus hobleyi*, Neave, f. n. *künowoides*, a male form only.
7–9. *Pseudacraea eurytus hobleyi*, Neave, f. *hobleyi*, a male form only.

All the specimens were captured by native collectors at Entebbe, Uganda.

1. ♂. Feb. 17–20, 1929.
2. ♂. July 10–13, 1928.
3. ♀. Nov. 13–16, 1928.
4. July 21–24, 1928.
5. Aug. 10, 1929.
6. Sept. 21–25, 1928.
7. Feb. 20, 1926.
8. March 20, 1926.
9. June 24–30, 1928.

Figure 4 is selected as the type specimen of the new form. The trace of yellow along the inner margin of the hind-wing of this specimen and of number 5 is too small to be shown by the photograph, which, however, well indicates the patch at the anal angle in 1–3. The richer colour of the orange bar on the fore-wing is well shown in 4–6, as well as the peculiar shape.

All the specimens are figured natural size.



Alfred Robinson Photo.

All figures are natural size.

A Uganda Butterfly, *Pseudacraea künowi neumanni* (1, 2 ♂♂; 3 ♀), mimicked by *Ps. eurytus hobleyi* ♂ *f. künowoides* (4–6), developed from the ♂ f. *hobleyi* (7–9) of the same species. All the patterns are beautifully mimetic of Acraeas (*Planema*).

Recently, while sorting out a collection from Entebbe, Dr. Carpenter found that a specimen of *Pseudacraea*, which had at first glance been placed among *künowi*, was in fact a variety of *eurytus hobleyi* in which the fore-wing band very strongly resembled that of *künowi*. A number of similar specimens were found, and the form seems definite enough to receive a distinctive name and is described below as *künowoides*, f. nov. It seems possible that this is a case of secondary resemblance between mimics of a common model; the more robust and stable *künowi* having drawn after it some of the smaller, less robust and more variable forms of *eurytus hobleyi*.

A search through the large collections made by Dr. C. A. Wiggins at Entebbe in the years 1909–12 showed a number of *künowoides* and of forms intermediate between *künowoides* and *hobleyi*; but no typical *künowoides* were found in collections from the Sese Isles, although a single intermediate was taken on Kimmi Islet early in 1914.

A remarkable *female* form of *eurytus* taken in 1929 on Buvuma Island, opposite Jinja at the source of the Nile from the lake, which has not yet been described, has the orange band on the fore-wing quite definitely of the *künowoides* pattern, while the hind-wing is as in the *male* form *opisthoxantha* in which the white of the *hobleyi* form is replaced by orange. A transition towards this interesting combination is shown by the four male *eurytus* taken at the same time as this female.

The new form, *künowoides*, like other forms of *eurytus*, is not completely separated from its allies; a continuous series can be put together as showing gradations from *hobleyi*.

One of the many forms figured in Jordan's paper (Ref. 2, Plate XXI, fig. 1*a*) appears to be *künowoides*, but without seeing the specimen one cannot tell whether the orange band is of the deep hue characteristic of *künowoides*. Curiously enough, this specimen, which was captured at Entebbe in June 1900 by Capt. Rattray, was chosen to illustrate *hobleyi*, but the typical *hobleyi* as described by Neave (Ref. 1) does not have the orange band so sharply angulated and narrowed anteriorly.

Poulton (Ref. 3) suggests that *künowi* has been drawn towards *hobleyi* and is an example of "secondary mimetic approach." But the distinction that can now be drawn between typical *hobleyi* and a form much more like *künowi* which is less abundant than *hobleyi*; the fact that *künowi* is a more robust and powerful butterfly than *hobleyi*; and the stability of *künowi* compared with the great variability of *hobleyi*, seem to suggest that the situation is probably the reverse and that it is *künowi* which has acted as the secondary model.

Particular attention was directed to the trace of orange at the anal angle of the hind-wing of the most typical *künowoides* which is absent in typical *hobleyi* and is so small in *künowoides* that it could hardly be considered to be part of the aposeme copied by *künowi*, in which the orange anal patch on the hind-wing is very characteristic. But the trace of orange on the hind-wing in *künowoides* at once takes on a new significance if it is regarded as an attempt at copying the feature of *künowi*.

The following figures give the proportions of the species of *Pseudacraea* mentioned in this paper which were noted in a rapid search through collections at Oxford. A more prolonged and closer scrutiny would possibly result in slight alterations, especially in the heading "transitional forms," but the general proportions may, I think, be taken as indicating the prevalence of the forms.

Collector.	Locality.	Date.	Forms of *eurytus*.				*künowi.*
			hobleyi.	trans. to *künowoides.*	*künowoides.*	*poggeoides.*	
C. A. Wiggins	Entebbe.	1909–12	72	16	12	5	22
G. D. H. Carpenter.	Bugalla Isle, Sese, L. Victoria.	1912–13	28	0	0	2	9
" "	Kome group of Isles, Sese.	1914	18	1	0	0	0

The female form *poggeoides* which, belonging to this combination, is a special mimic of *Planema poggei*, is also included as a matter of interest.

A small collection made by two natives for the exhibitor in 1928–9 at occasional intervals at Entebbe resulted in the following numbers: *hobleyi* 9, transitional 3, *künowoides* 4, *poggeoides* 2, *künowi* 9. The proportion of *künowi* is here much higher. Dr. Carpenter thought that there may have been a certain amount of selection of it by the captors. But it is remarkable that the proportion of *künowoides* and of transitionals is also higher.

The orange and white scheme of coloration to which these butterflies belong appears to be characteristic of Uganda, and occurs in only a few butterflies in W. Africa. Thus, both *Planema poggei* and *Pseudacraea künowi* have western forms, but they are of much greater rarity than the eastern forms.

The unimportance of this coloration in W. Africa is illustrated by the female of *Acraea alciope* which, with occasional exceptions only, adopts this aposeme in Uganda, while in W. Africa it is of a brown form corresponding to a common type of coloration among the larger Acraeines there. *Planema macaria* similarly adopts a white hind-wing when in Uganda, but in W. Africa falls into line with the other brown species of *Planema*.

It is therefore not surprising that *Pseudacraea eurytus* in West Africa does not produce a form like *hobleyi* or *künowoides*. No specimens of these forms from W. Africa were seen in the National Collection, and Dr. Jordan kindly informed the exhibitor that at Tring there were no *eurytus* with orange fore-wing band and white hind-wing band from W. Africa.

Mr. G. Talbot wrote in a similar strain regarding the collection at the Hill Museum, Witley, but kindly stated that the male of *simulator* (which appears to be one of the forms of *eurytus*, though this has not yet been proved by breeding) sometimes has a whitish suffusion forming an indistinct band on the hind-wing below the cell, which may be the commencement (or relic) of the well-marked white band of Uganda. The pattern of the fore-wing of the male *simulator* is not like that of *hobleyi*, etc.

Pseudacraea eurytus, f. n. **künowoides.**

Generally resembles male form *hobleyi*, Neave, but the orange band on the fore-wing is of a deeper and richer hue. The part of the band anterior to the posterior margin, or sometimes the middle, of cellule 3, is suddenly narrowed to about half of the width of the band posterior to that level. The outer half of the anterior part of the band is thus replaced by the dark ground-colour: consequently the band in shape and colour resembles that of *Pseudacraea künowi neumanni*, Thurau (= *hypoxantha*, Jord.). This resemblance is increased by the presence of a small amount of orange at the anal angle of the hind-wing which can be faintly traced a little way along the inner margin. In other respects the hind-wing resembles that of typical *hobleyi*. The description of *Pseudacraea fickei*, Weym., in Seitz's *Macrolepidoptera of the World* ("African Rhopalocera"), **13**: 196, 1925, seems to correspond with the above as regards the shape of the fore-wing band, but does not agree as regards the hind-wing.

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EXTRA-INTESTINAL DIGESTION IN CICINDELID LARVAE: SOME OBSERVATIONS ON THE "FURAU" OF NORTHERN NIGERIA.—Dr. V. B. WIGGLESWORTH said that throughout Northern Nigeria there occurs a creature which lives in holes in the ground, chiefly along footpaths, which is an object of great fear to the natives; for it is said to attack the feet of passers-by and cause a painful and chronic inflammation. Both the creature and the lesions which it is supposed to produce are called "Furau," a name derived from the Hausa word *fura*, to blow or kindle.

It has long been known that the creature in question is a large Tiger Beetle larva, which Mr. K. G. Blair has kindly identified as *Megacephala megacephala*, Ol. (= *senegalensis*, Latr.), and while in Nigeria a number of these was obtained and experimented with. It was found that, like the larvae and adults of CARABIDAE, these Cicindelid larvae eject the contents of the gut into the insects upon which they prey. The tissues of their victim are digested, and the resulting fluid is taken in again by the larva. The bites of the larva had no effect on the skin of a monkey; and when, after much persuasion, several human volunteers allowed themselves to be bitten, they were equally unaffected. It would seem, therefore, that the inflammation of the foot, a well-recognised clinical condition in those parts, must be due to some other cause.

A full account of this work was published in 1929, *Bull. Ent. Res.*, **20**: 403-406.

DEMONSTRATION OF THE EPIDIASCOPE.—Mr. HUGH MAIN gave a demonstration of the epidiascope recently presented by Mr. ROBERT ADKIN.

Papers.

The following papers were read:—

1. "A Synonymic List of Dragonflies of the Oriental Region," by Mr. F. F. LAIDLAW.
2. "Insect Teratology.—Part I. Homoeosis; Part II. Extra Wings," by Dr. E. A. COCKAYNE.
3. "Metasternal Glands of certain Heteroptera," by Mrs. M. D. BRINDLEY.
4. "The Biology of *Rhodnius prolixus*," by Dr. P. A. BUXTON.

5. "Psammocharidae and Sphecidae.—Collected records of different methods of filling stocked burrows," by Dr. G. D. Hale Carpenter.

6. "Microlepidoptera of Mauritius," by Mr. E. Meyrick.

7. "A Revision of the Greenland species of *Limnophora* (Diptera), etc.," by Mr. J. E. Collin.

8. "New European Trichoptera and Plecoptera," by Mr. M. E. Mosely.

Wednesday, June 18th, 1930.

Dr. K. Jordan, President, in the Chair.

In opening the meeting, the President welcomed on behalf of the Society the delegates to the Third Imperial Entomological Conference.

Election of Fellows.

The following were elected Fellows of the Society:—A. A. Lisney, B.A., Cremorne, Shankill, Co. Dublin; M. D. Austin, Department of Economic Entomology, South-Eastern Agricultural College, Wye, Kent.

Exhibits.

A migratory *Sphex* parasitic on migratory locusts.—Mr. C. B. Williams exhibited some specimens of a Sphegid—possibly *Sphex aegyptiacus*—the females of which appeared in large numbers at Amani, Tanganyika Territory, in February 1929 simultaneously with the arrival of great swarms of the locust *Schistocerca peregrina* on which they were preying, and which disappeared on the following day when the locusts departed. It seems that the predator has developed a migratory habit in order to keep in touch with its migratory host.

Unusual formation of the eyes of certain Aleurodidae.—Mr. C. B. Williams exhibited two microphotographs of the eyes of *Aleurodes brassicae* and *A. proletella* which are British species of the Homopterous family Aleurodidae. The eyes in these species are completely divided into an upper and a lower half; the lenses in the lower half are larger than those in the upper half and are arranged in a remarkable way, in that hexagons of six, thick, deeply staining lenses surround single thinner lightly staining lenses. The thick lenses must be of short focal length and the thin lenses either of longer focal length or perhaps more likely are functionless. The histology of the internal structure of the eye beneath has not yet been studied.

Butterflies from the Herzog Mts., Eastern New Guinea.—The President said that the majority of the specimens exhibited had already been shown at the Meeting of the 6th March, 1929; but as the collection was of particular interest inasmuch as it illustrated the composition of the Butterfly fauna at higher altitudes in New Guinea, Professor E. B. Poulton and he had agreed that it would be advisable to publish a detailed record of the collection illustrated by photographic plates.*

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* We are indebted for a grant, authorized by Professor Poulton from the Oxford University Fund for Promoting the Study of Organic and Social Evolution, for Plates II–IV, illustrating these Mimetic Associations.

Mr. Albert F. Eichhorn, an experienced collector, who, alone and in collaboration with Mr. A. S. Meek, had successfully carried out several expeditions for the Tring Museum, went early in 1928 from Huon Gulf to the Herzog Mts. with the object of collecting birds and Lepidoptera in these hills, which had not yet been explored by a naturalist. He made camp at 6100 ft., but his health broke down and he had to be transported back to the coast before having seriously commenced collecting. A collection of less than 700 Lepidoptera arrived at Tring as the result of the abortive expedition. These specimens had been divided by the collector into three lots: one consisting of the specimens obtained at 3200 ft. and containing the usual lowland species, the second being gathered on the march from 3200 to 5400 ft. and consisting of a mixture of lowland and mountain species, and the remainder being collected round about camp at 6100 ft. It is this last collection which arrests attention. The number of specimens of each species and the state of preservation render it evident that no attempt had been made at collecting rarities only, but that all the specimens, good and bad, had been taken as they came before the net. The collection, therefore, gives us a fair idea of which butterflies are most in evidence at that altitude and can be gathered in a short time within a small radius and without intensive search.

The collection from 6100 ft. consists of 301 specimens belonging to 42 species, as follows :—

NYMPHALIDAE, 8 species in 79 specimens;
PAPILIONIDAE, 1 species in 38 specimens;
PIERIDAE, 19 species in 159 specimens;
RIODINIDAE, 2 species in 2 specimens;
LYCAENIDAE, 12 species in 23 specimens.

The PIERIDAE are dominant; they belong to the genus *Delias*, with the exception of two specimens. The NYMPHALIDAE (s. lat.) follow next in number, but nearly all represent species of Satyrine genera restricted to the mountains of New Guinea. The smallness of the number of specimens of LYCAENIDAE, 23 in all, is evidence that no thorough collecting had as yet been done when Eichhorn broke down, the family being very rich in individuals and species in New Guinea.

The most striking feature of the aggregate of 301 specimens is the prevalence of black and white uppersides. No less than 211 specimens are black and white, and 10 others have at least a prominent white band or patch on the upperside. The majority of the PIERIDAE have this combination of colours, as is to be expected; but that also many Satyrines and Lycaenids appear in this Pierid garb, which is an unnatural coloration, for the Satyrines at least, is most interesting, and one would like to know whether among the day-flying moths also at this altitude a larger proportion is black and white than at low elevations. Mr. Eichhorn obtained a few day-flying moths, and some of them are black and white; but the numbers are much too small to be of statistical value. It is difficult for the leader of an expedition of this kind, if he is not a Lepidopterist and if he has to depend to a large extent on non-European assistants, to keep specimens from different altitudes strictly apart, the hunters having no perception of the importance of accurate data. But if camp were made well above 8000 ft., for instance in the Surawaged Mts., which are now easy of access from Huon Gulf, observations of the kind here indicated could readily be made.

As an explanation of the prevalence of black and white uppersides in the butterflies of the higher mountains in New Guinea, it may be suggested either that altitude with its attendant peculiarities of climate has produced this coloration, or that, as is much more likely, the presence of a mass of species and specimens of PIERIDAE in the mountains has had such a marked influence on the coloration of the butterflies associated with them that many of these have assumed the black and white Pierid upperside colouring. However, in an inquiry into the origin of the colouring of these mountain butterflies, another fact should not be overlooked: the females of some of the Pierids are very conspicuously orange and black and the undersides of most *Delias* bear bright red or yellow markings; but against expectation, none of the other butterflies of the mountains have acquired this exterior, the only approach to a *Delias* underside being found in some species of the Nymphaline genus *Mynes* occurring at lower elevation in the Papuan region (together with some lowland *Delias*).

In several species of *Delias* from the mountains the underside has become more or less extended black, the extreme of this development being found in *Delias hypomelas*, evidently an offshoot from *Delias itamputi* in which the underside has preserved a variable amount of white. It is interesting to note that this tendency towards a suppression of white is also observed in the Satyrine *Pieridopsis virgo*, as illustrated on Plate IV, fig. 1 representing *Delias hypomelas* and figs. 2 to 5 the males and figs. 6 to 9 the females of the Satyrine. Our series of this *Pieridopsis virgo* from various parts of New Guinea contains so many intermediate individuals that the transition from one extreme to the other may be called gradual and complete. We must not assume, however, that evolution has here proceeded from the form with the largest amount of white on the under surface. Our series seems to demonstrate that the ancestral form in the series of individuals is the one with definite black and white bands, as represented by figs. 2 and 7, and that there are two lines of development, the one, by the suppression of black, resulting in a more or less white underside (we have specimens more extended white than is shown in fig. 6), and the other, by the suppression of white, resulting in a black underside, evolution here leading to a similar dimorphism as is found in *Mynes geoffroyi*, Guér., 1829. The hind margin of the fore-wing underside covered by the hind-wing remains white even in the blackest specimens of the *Delias* and *Pieridopsis*, visibility evidently "being a factor in the process of evolution" (cf. 1929, *Proc. Ent. Soc. Lond.*, **4**: 13).

List of species.—Locality: Edie River, west side of Herzog Mts. Time: Early 1928, no more precise date being given with the specimens.

NYMPHALIDAE.

1. *Mynes aroensis*, Ribbe, 1900; 1 female, too bad for figuring. The specimen photographed (Plate II, fig. 11) was collected by A. S. Meek at Biagi, Mambaré R.

2. *Morphopsis meeki*, Roths. & Jord., 1905; 4 males. The specimens agree with those from more southern parts of New Guinea.

3. *Platypthima decolor*, Roths. & Jord., 1905; 13 males, 4 females. Described from a single male, no additional specimens having come to hand until this collection arrived. The female resembles the male, but is slightly broader in the wings and a little paler.

4. *Platypthima homochroa homochroa*, Roths. & Jord., 1907; 13 males, 4 females. Only two specimens from Biagi were known.

5. *Erycinidia hemileuca*, Jord., 1930; 3 males (Plate II, fig. 15).

6. *Erycinidia tenera*, Jord., 1930; 1 male.

7. *Pieridopsis virgo*, Roths. & Jord., 1905; 18 males, 16 females (Plate II, figs. 12 and 13, upper- and undersides; Plate IV, figs. 2 to 9, undersides). Both sexes vary to the same extent, but from the Edie R. we have no female with the underside of the hind-wing as black as in the male represented by fig. 5.

8. *Pieridopsis ducis*, Jord., 1930; 2 males (Plate II, fig. 14). The two specimens are practically alike in pattern.

PAPILIONIDAE.

1. *Papilio weiskei*, Ribbe, 1900; 38 males, some more blue in tone than others. It is remarkable (1) that this evidently common species escaped discovery until Weiske found it on his hazardous trip into the interior, and (2) that the specimens from Eastern and Western New Guinea do not exhibit any geographical differences.

PIERIDAE.

1. *Terias hecabe octa*, Fruhst., 1910; 1 male only, possibly an accidental occurrence, or accidentally placed among the Edie R. material.

2. *Appias melania saina*, Grose-Smith, 1894; 1 male (Plate II, fig. 10); the remark under *Terias hecabe* perhaps applies equally to this specimen.

3. *Delias isocharis isocharis*, Roths. & Jord., 1907; 2 males, 2 females (Plate II, fig. 8).

4. *Delias kummeri*, f. *kummeri*, Ribbe, 1900; 1 male (Plate III, fig. 6).

5. *Delias callima satura*, Jord., 1930; 1 male; a second male, in bad condition, from between Watut R. and Buiang, 3200 to 5400 ft. (Plate III, fig. 5).

6. *Delias sagessa*, Fruhst., 1910; 1 pair, also 1 male from between Watut R. and Buiang (Plate II, fig. 4).

7. *Delias iltis*, Ribbe, 1900; 7 males, 11 females (Plate II, fig. 9).—The single male described by me in 1911 (Nov. Zool. Tring, **18**: 584) as *Delias iltis luctuosa* represents a distinct species.

8. *Delias bornemanni entima*, Jord., 1930; 12 males, 5 females (Plate III, fig. 4).

9. *Delias niepelti*, Ribbe, 1900; 3 males, 2 females (Plate III, fig. 2). The female is bright orange and black.

10. *Delias meeki meeki*, Roths., 1904; 14 males, 1 female (Plate III, fig. 3). The female resembles that of the preceding species, but the basal half of the hind-wing upperside is white, the orange colour being only retained in the costal area which is covered by the fore-wing.

11. *Delias hypomelas rawlinsoni*, Talbot, 1928; 8 males, 5 females (Plate II, fig. 3; Plate IV, fig. 1). Described in Bull. Hill Mus., **2**: 43.

12. *Delias eichhorni eichhorni*, Roths., 1904; 5 males, 1 female (Plate II, fig. 6).

13. *Delias clathrata limata*, Jord., 1930; 1 male, 6 females (Plate III, fig. 8).

14. *Delias weiskei weiskei*, Ribbe, 1900; 7 males, 2 females (Plate II, fig. 2).

15. *Delias mira excelsa*, Jord., 1930; 6 males, 7 females (Plate III, fig. 1).

16. *Delias microsticha terranea* Talbot, 1928; 15 males, 2 females (Plate II, fig. 1).

17. *Delias cuningputi aemula*, Jord., 1930; 4 males (Plate III, fig. 7).

18. *Delias pheres endela*, Jord., 1930; 4 males (Plate II, fig. 5).

19. *Delias aroae aroae*, Ribbe, 1900; 15 males, 6 females (Plate II, fig. 7).

RIODINIDAE.

1. *Praetaxila weiskei huonis*, Jord., 1930; 1 female. Upperside black-brown, with white markings.

2. *Dicallaneura amabilis amabilis*, Roths., 1904; 1 male. Only one other male known to us, besides 18 females.

LYCAENIDAE.

1. *Deudoryx grandis*, Roths. & Jord., 1905; 1 female in bad condition. The specimen figured was obtained by A. S. Meek on the Angabunga R., Southern New Guinea (Plate III, fig. 9).

2. *Parachrysops bicolor*, B.-Baker, 1904; 1 male (Plate III, fig. 11). Originally described from two females (not males as stated by the author). The male differs in the termen of the fore-wing being a little less convex, in the white streak along the hind margin being longer, and in the slate-grey colouring of the fore-wing beneath being paler and less extended.

3. *Candalides owgarra*, B.-Baker, 1906; 1 male (Plate III, fig. 15). The various species described by B.-Baker in Ann. Mag. Nat. Hist. (7), **17**: 100–101 did not come from Owgarra, but from the Angabunga R., which is not far distant, however. The mistake was made by Mr. Meek's agent, who distributed the remaining specimens after the Tring Museum had selected a first set.

4. *Candalides meeki*, B.-Baker, 1906; 2 males, 1 female (Plate III, fig. 14).

5. *Candalides hemileuca*, Jord., 1930; 2 males (Plate III, fig. 13).

6. *Candalides neurapacuna*, B.-Baker, 1908; 1 male.

7. *Candalides sublutea*, B.-Baker, 1906; 1 male.

8. *Celastrina leucothelia*, Jord., 1930; 1 pair; the male with a pale blue upperside, the female (Plate III, fig. 12) black and white.

9 & 10. *Celastrina* spec., not identified; 1 male of each; upperside blue.

11. *Thaumaina uranothauma*, B.-Baker, 1908; 2 males, 1 female (Plate III, fig. 10). The male is pale blue and black instead of white and black as the female figured.

12. *Callictita albiplaga*, Fruhst., 1927; 5 males, 1 female. Both sexes with a conspicuous white patch on the upperside of the hind-wing.

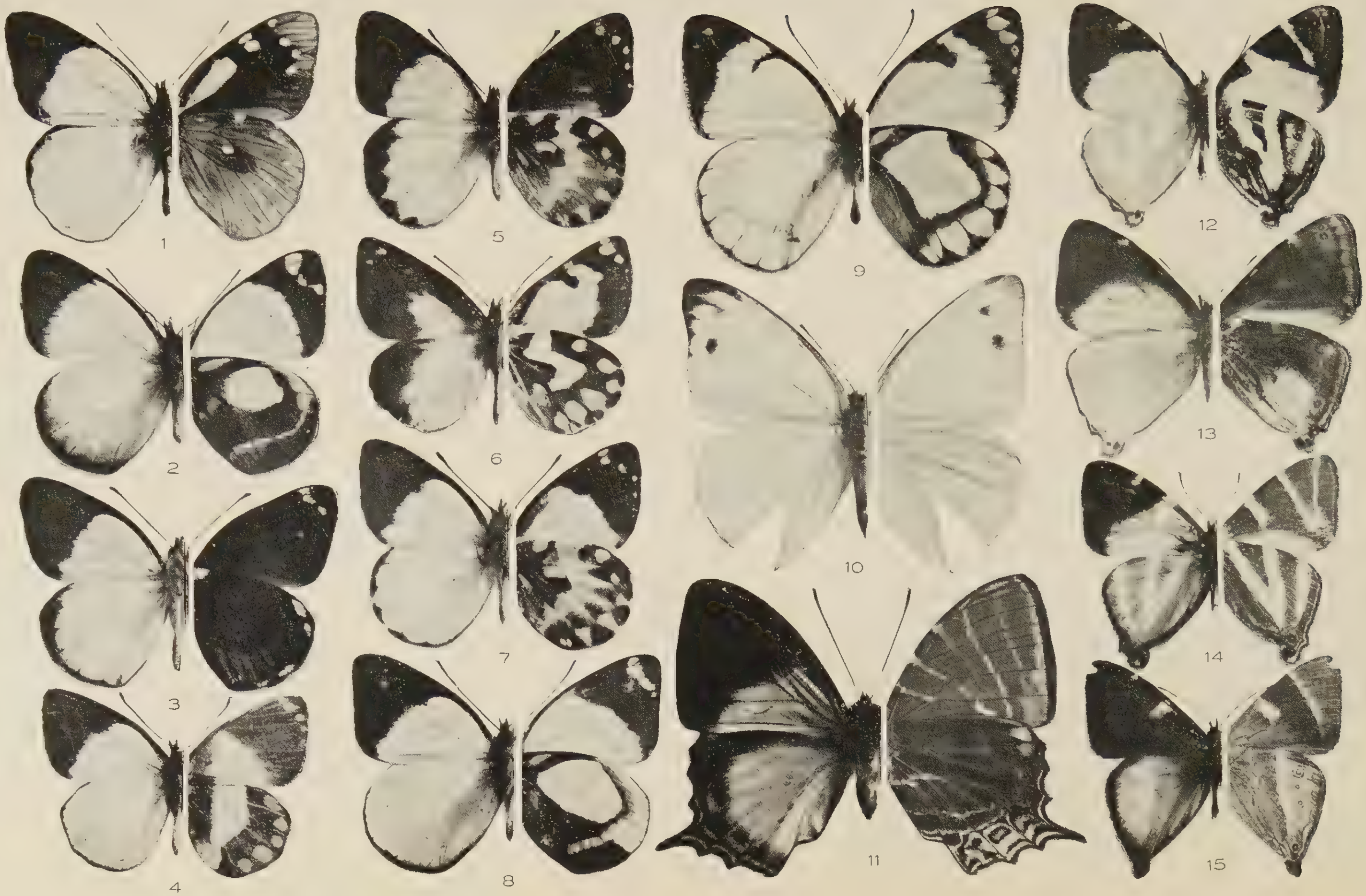
The new species and subspecies in the collection were described in Nov. Zool. Tring, **35**: 277 *et seqq.* (1930).

The butterflies not figured on plates II to IV are not similar, or only remotely similar, to black and white Pierids.

FORMS OF THE LARGE COPPER.—Colonel F. A. LABOUCHERE exhibited two insects purchased at the recent sale of Dr. Cosmo Melvill's collection, said to be specimens of the var. *rutilus* of *C. dispar* taken in the fens in 1843 and given by Mr. Doubleday to the Banksian collection. On comparing them with specimens of *rutilus* from Capt. Purefoy's Irish Colony (the original stock of which came from near Berlin) it

EXPLANATION OF PLATE II.

FIG. 1. *Delias microsticha terranea*, Talbot, ♂.
2. *Delias weiskei weiskei*, Ribbe, ♂.
3. *Delias hypomelas rawlinsoni*, Talbot, ♂.
4. *Delias sagessa*, Fruhst., ♂.
5. *Delias pheres endela*, Jord., ♂.
6. *Delias eichhorni eichhorni*, Roths., ♂.
7. *Delias aroae aroae*, Ribbe, ♂.
8. *Delias isocharis isocharis*, Roths. & Jord., ♂.
9. *Delias iltis*, Ribbe, ♂.
10. *Appias melaina saina*, Grose-Smith, ♂.
11. *Mynes aroensis*, Ribbe, ♀.
12. *Pieridopsis virgo*, Roths. & Jord., ♂.
13. ditto ♀.
14. *Pieridopsis ducis*, Jord., ♂.
15. *Erycinidia hemileuca*, Jord., ♂.



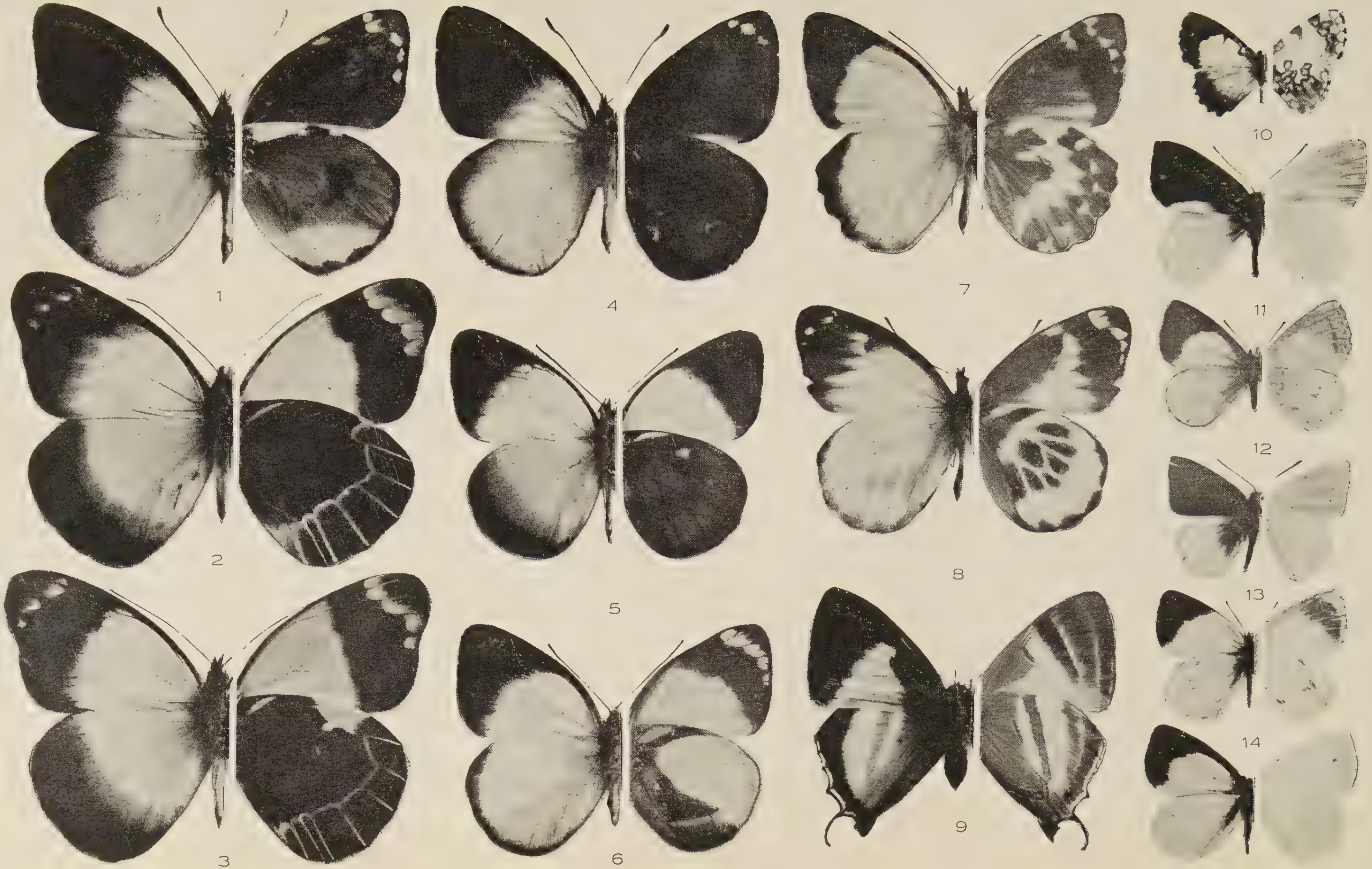
ALFRED ROBINSON PHOT.

All figures natural size

Predominant upperside pattern (L. sides) compared with diverse undersides (R. sides) of butterflies from Herzog Mts. E. New Guinea. 1 to 10—ten PIERINÆ (with eight on succeeding plate); 11—a Nymphaline; 12 to 15—three SATYRINÆ (12♂ 13♀ of one sp.)

EXPLANATION OF PLATE III.

FIG. 1. *Delias mira excelsa*, Jord., ♂.
2. *Delias niepelti*, Ribbe, ♂.
3. *Delias meeki meeki*, Roths., ♂.
4. *Delias bornemanni entima*, Jord., ♂.
5. *Delias callima satura*, Jord., ♂.
6. *Delias kummeri* f. *kummeri*, Ribbe, ♂.
7. *Delias cuningputi aemula*, Jord., ♂.
8. *Delias clathrata limata*, Jord., ♂.
9. *Deudorix grandis*, Roths. & Jord., ♀.
10. *Thaumaina uranothauma*, B.-Baker, ♀.
11. *Parachrysops bicolor*, B.-Baker, ♂.
12. *Celastrina leucothelia*, Jord., ♀.
13. *Candalides hemileuca*, Jord., ♂.
14. *Candalides meeki*, B.-Baker, ♀.
15. *Candalides owgarra*, B.-Baker, ♀.



Alfred Robinson Phot.

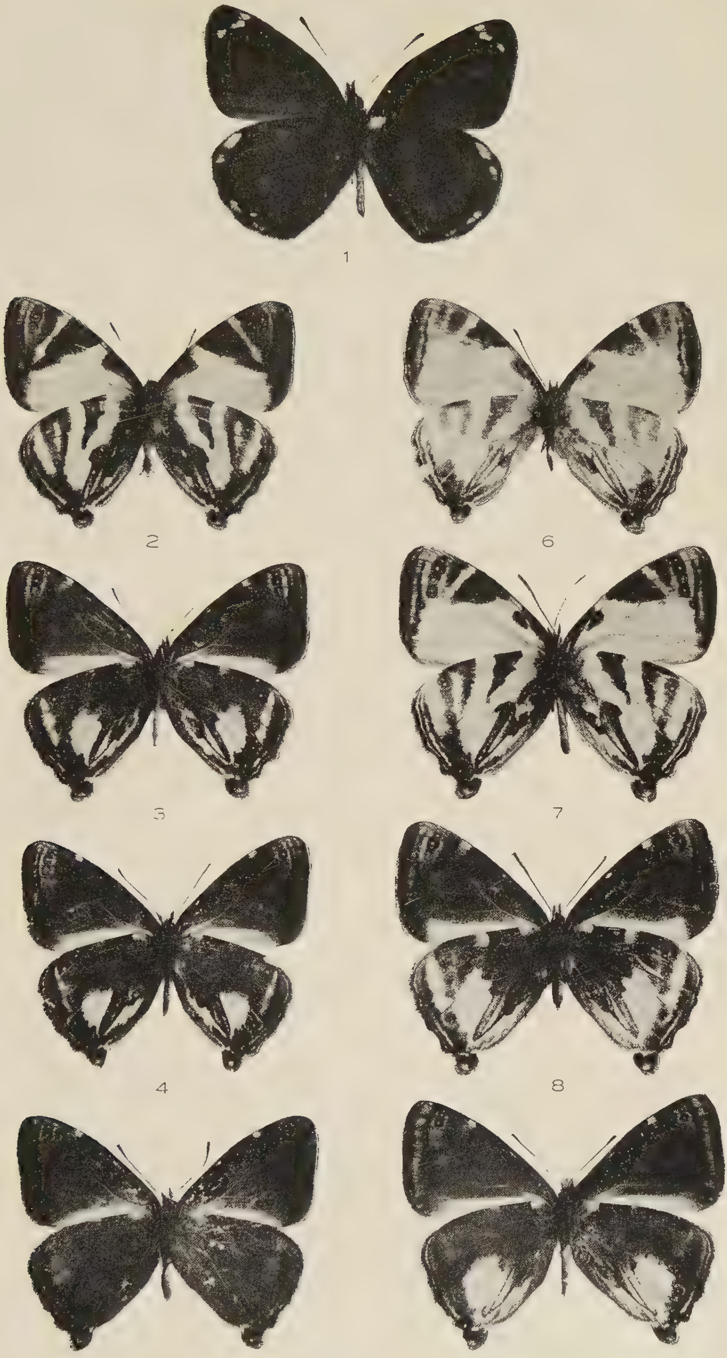
All figures natural size

Predominant upperside pattern (L. sides) compared with diverse undersides (R. sides) of butterflies from Herzog Mts. E. New Guinea. 1 to 8—eight PIERINÆ (with ten on preceding plate); 9 to 15—seven LYCÆNIDÆ

EXPLANATION OF PLATE IV.

(undersides only).

FIG. 1. *Delias hypomelas rawlinsoni*, Talbot, ♂.
2–5. *Pieridopsis virgo*, Roths. & Jord., ♂♂.
6–9. ditto ♀♀.



ALFRED ROBINSON PHOT.

All figures natural size

Undersides of four males (2-5) and four females (6-9) of the Satyrine butterfly *Pieridopsis virgo*, shewing transition from white to black like the Pierine (1). Upper sides of 1, 2 and 9 shewn on L. sides of 3, 12 and 13 of plate 2.

was evident that they were not true continental *rutilus*, though nearer that form than to *dispar*.

As it is a much disputed point whether *rutilus* was ever found in the fens, in consultation with Mr. Riley he had compared them with specimens of *dispar*, *rutilus* and the Dutch *dispar batavus* and other forms of the insect in the British Museum collection. They had both arrived independently at the same conclusion, viz. that they were identical with the St. Quentin form, of which five specimens are in the S. Kensington Museum. So far as could be ascertained this form has been extinct for some time. The late M. Chas. Oberthür sent Mr. Powell to the St. Quentin district some years ago to try and locate it, but without success, and M. Henri Brown of Paris stated that he had hunted for it in that place before the war, but had seen no sign of it.

This St. Quentin form seems to be transitional between *rutilus* and *dispar* though nearer *rutilus*, and were it possible to cross *dispar* with *rutilus* a somewhat similar result might be expected, though as a matter of fact *rutilus* crossed with *dispar batavus* from Wood Walton Fen resulted in typical continental *rutilus*. Mr. Riley was able to bring some of these from the Natural History Museum to show the meeting.

As regards var. *rutilus* being found in the fens, the speaker read the following note from Mr. Bethune-Baker.

" *June* 7, 1930.

" You asked me last Wednesday about the specimens of *Heodes dispar*—now in the B.M.—collected by my father. They were captured between the years 1830 and 1834 or 5, at which latter date he began studying for the Medical profession and never collected insects again. There is no question as to their British origin as they were taken by himself, and he never went on to the Continent at all. You will see that one or two of them are somewhat transitional to *rutilus*, but the red marginal border is broader on the underside and the spots larger, the tone is bluer and the texture is rougher, and *rutilus* has a smoother underside, at least so it seems to me. My specimens are certainly nearer *dispar* than *rutilus*. Another point struck me also, *viz.* that *dispar* was a more robust-looking insect. It was very distressing to me that I was not able to complete my Monograph of this family."

There is no reason to doubt the sincerity of the above note, and though it is not impossible that Mr. Bethune-Baker's father, who never went abroad, and ceased to collect early in life, may have had continental specimens sent him, it does not seem probable that that happened as he would doubtless have made a note to indicate their origin.

If, as Mr. Bethune-Baker says, his father took *rutilus* in the fens there is no reason why Mr. Doubleday should not have done the same. Of course there is always the possibility that some enterprising person may have introduced specimens from France into the fens, especially in the last few years when the insect was getting very rare; but the speaker was inclined to doubt this, as at that time the interest in entomology was limited.

How the specimens now in the exhibitor's possession came into the possession of Dr. Melvill is unknown. The legend on them is to the effect that they were given by Mr. Doubleday to the Banksian collection, presumably Sir Joseph Banks' collection which was afterwards acquired by the British Museum together with his books and manuscripts. It is known that certain of the latter went astray and turned up in auction rooms in recent times. It is therefore possible that some of the entomological specimens may have strayed in the same way.

Specimens of *rutilus* and *dispar batavus* were exhibited for comparison. The chief points of difference to be noted are:—on the fore-wings of the ♀ the postdiscal series of black spots are larger in *dispar batavus* and the Melvill coll. specimens than in *rutilus*, the narrowness of the marginal reddish band on the lower surface of the hind-wing and frequent obsolescence towards the apex in *rutilus*.

BIRDS ATTACKING BUTTERFLIES.—Dr. G. D. HALE CARPENTER said that, with reference to Prof. Poulton's remarks at the last meeting on birds attacking butterflies, at 5.45 p.m. on the 11th June he had seen a thrush standing at the roadside on the outskirts of Oxford, with a white butterfly, probably *Pieris brassicae*, held horizontally with the wings apposed, in its beak. In his opinion it was likely that such occurrences usually took place when butterflies were resting owing to cloudy weather or at the onset of evening, and for this reason were likely to pass unnoticed by casual observers. He added that he had seen a black Cuckoo-shrike start a *Belenois* and attempt to catch it in German East Africa during September 1917.

COENOSIA HUMILIS, MG. (DIPTERA; ANTHOMYIDAE) AND ITS INSECT PREY IN THE LIVERPOOL DISTRICT.—Prof. POULTON, in the absence of the author, Dr. Alwen M. Evans, D.Sc., exhibited the 52 examples of captors and their Dipterous, Hemipterous and Psocopterous prey, and referred to the economic value of these carefully observed and recorded facts.

THE MUD CYLINDERS CONSTRUCTED BY THE LARVAE OF THE AFRICAN *TABANUS BIGUTTATUS*, WIED. (DIPTERA; TABANIDAE).—Prof. POULTON in the unavoidable absence of the author, Dr. W. A. Lamborn, O.B.E., exhibited three cylinders recently brought by his friend from Nyasaland. They had been obtained at Mzeze, 32 miles north of Fort Johnston, the locality of the cylinder exhibited on 5 February, 1930 (*Proc. Ent. Soc. Lond.*, **5**: 13, and *Proc. Roy. Soc.* (B), **106**: 83). In all essential respects these three cylinders resembled the one first seen in this country, providing the most convincing proof of the validity of Dr. Lamborn's conclusions.

BALL-TAPS CHOKED BY *MUSCA AUTUMNALIS*, DE G. (*CORVINA*, F.), AT ST. HELENS, I.W.—Prof. POULTON brought for exhibition a tube he had intended to show to the Society at the last meeting. It contained a mass of flies, taken 30 March, and 7 April, 1930, respectively, from two ball-taps which they had more or less completely choked.

THE CONTRAST BETWEEN TWO PAIRS OF THE NYMPHALINE BUTTERFLY *PRECIS OCTAVIA SESAMUS*, TRIM., TAKEN IN E. AFRICA.—Prof. POULTON exhibited two pairs of *Precis o. sesamus* taken *in coitû*. In one of these, captured by Canon St. Aubyn Rogers on Kilimanjaro, 22 September, 1905, a fresh Wet Season male had paired with a more worn Dry Season female (*Proc. Ent. Soc. Lond.*, **1906**: lviii–lx; *ibid.*, 1929, **4**: 72). In the second pair taken in 1927 at nearly the same time of the year, viz. 29 September, by Mr. G. H. E. Hopkins, at Nairobi, a fresher Dry Season male had paired with a less fresh Wet Season female (*ibid.*, 1928, **3**: 45). Although both pairs had been exhibited to the Society on previous occasions the comparison between them had not at the time suggested a probable explanation of these exceptional pairings between the wet and dry forms. It was to be observed that in both pairs the male was fresher than the female, the reverse of the usual relationship. On Kilimanjaro Canon Rogers captured 8 Dry Season forms, one intermediate, and a single " beautifully fresh " Wet form—the one referred to as *in coitû*. These facts suggested that the males of one seasonal form which is about to replace the other tend to emerge before their females and are therefore attracted to those of the previous form still lingering on. The fresh condition of the Nairobi male as compared with the female was consistent with an interpretation strongly suggested by the facts observed on Kilimanjaro.

THE HUMMINGBIRD HAWKMOTH, *MACROGLOSSA STELLATARUM*, L., SEEKING THE REPRESENTATION OF FLOWERS ON A WALL-PAPER.—Prof. POULTON said that Mr. G. Fox-Wilson, F.E.S., had kindly sent to him, and his friend Prof. Foligno had kindly translated a letter from Signor Giuseppe Pallotti of Como, recording the following observation :—

" 11 *February*, 1930.—I have read in the *Corriere della Sera* about your researches concerning insects which bring about the fecundation of flowers and about the results you have reached with regard to bees. It may therefore interest you to learn of a fairly singular observation which I chanced to make about a twilight butterfly * (Sphinx type).

" I was lying in bed one morning when the day was well advanced, with my window open, when one of these butterflies entered the room and started to turn towards the faded roses with which the wall-paper was decorated. These roses were of a washed-out tint of water-colour type, and there was no particular smell (in the room) either through scents in the room or other reasons; I should almost say that the roses were scarcely recognisable as roses. Despite this the butterfly hung on with its peculiar planing flight now in front of one and now in front of another of the roses as if on the point of extending against them its proboscis; and its manœuvres lasted for a time that I should estimate at about ten minutes; until it went out again through the window."

In later letters to Mr. Fox-Wilson and to the speaker Signor Pallotti stated that the insect had a sound-producing flight, and, so far as he could remember, from its size and coloration, was similar to specimens of *M. stellatarum* which had been sent to him. He could not be certain of this, however, for, as he wrote, " my attention was focussed on the strange and perfectly clear manœuvring of the butterfly. So much so that I never thought even to get out of bed and to shut the window in order to capture it."

Signor Pallotti also sent a sample of the wall-paper which was exhibited to the meeting. In the room itself, however, it had become " very much faded during the three years that had elapsed since it was hung."

Similar observations upon the same species had, he believed, been recorded, but not commonly, and the fact provided such striking evidence of guidance by sight and by no other sense, as Signor Pallotti had fully recognised, that this detailed confirmation was very welcome.

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* The word " farfalla " used here and throughout, and literally translated " butterfly," clearly means butterfly or moth.

[The following note, written by my friend Mr. A. H. Hamm, affords further interesting confirmation :—" On August 28 last I was sitting with a friend watching the Bowling Tournament at White Rock, Hastings. It was a day of scorching heat and he had borrowed a lady's sunshade bearing a pattern of brightly coloured flowers. Suddenly a Hummingbird Hawkmoth appeared, and, with extended proboscis, hovered over the flowers in the well-known manner, evidently touching the fabric; then, discovering the mistake, it as suddenly departed."

E. B. P. 9 October, 1930.]

CAPT. C. R. S. PITMAN'S OBSERVATIONS ON THE EXCESSIVE ABUNDANCE AND POSSIBLE MIGRATION OF A CATOCALINE MOTH IN UGANDA.—Prof. POULTON said that he had received the following notes from Capt. Pitman. Mr. W. H. T. Tams had kindly determined the specimens, which were exhibited to the meeting, as *Achaea catocaloides*, Guén.

" 11.iv.1930. *Entebbe.*

" I forward herewith three badly damaged specimens of a species of moth, in case it happens to be a migratory type. We have had phenomenal rains for some months, and recently when I was in the dense cover of the Botanical Gardens here on the 3rd April my attention was attracted by myriads of these moths which left the cover with a regular whirr of wings at each step as I disturbed the undergrowth. The houses are now swarming with the species. I killed several dozen inside the wire gauze of my verandah this morning, and as I write I can see dozens flying about outside. My pottos appreciate them as a tit-bit !

" The prevailing winds for the last ten days or so have been from the south, and there have been numerous terrific, nocturnal thunderstorms. I have found it quite impossible to suggest the direction to or from of any possible movement, though at one time to-day I fancied there was a tendency towards a drift westerly.

" What to my mind is most interesting, and more than mere coincidence, is the fact that I have been up at Fort Portal at the foot of Ruwenzori in the north-east, from 7th to 10th April, and I found there this same moth in myriads in the coffee plantations and ornamental gardens, and other cover.

" Birds are having a great time; and the black and white wagtail, *Motacilla aguimp vidua,* and the yellow-crested Bulbul, *Pycnonotus tricolor minor*, have been feeding on them till they became absolutely gorged ! I will watch carefully for the species to disappear."

[Capt. Pitman has since informed me that the moth remained fairly plentiful at Entebbe up to 15 April but that after this date only occasional specimens were observed. The wave of exceptionally abundant emergences seems to have passed westward and to have reached Miss Vinall's area around Bongandanga in the Belgian Congo towards the end of June; for in one of her collections, received 12 September, there were sixteen examples of *catocaloides* taken on the following dates :—25 June—1; 27 June—7; 28 June—4; 2 July—4. A note recorded that " these came out in great numbers on 26.vi.30," while the seven specimens of 27 June were " all caught early morning " My friend Commander Walker has kindly

THE ENTOMOLOGICAL SOCIETY OF LONDON

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MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W. 7

1931.

Wednesday,	January (Annual Meeting)	14
„	February	4
,,	March	4
,,	,,	18

The Chair will be taken at Eight o'clock.

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